MultiPASS C2500

SERVICE MANUAL

Canon

Application

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DTP System

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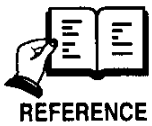
I. MEANING OF MARKS

The marks used in this manual have the following meanings.

Mark	Meaning
	States a precaution to be taken to prevent danger to personnel, damage to the product, or damage to electronic components by discharge of static electricity. for example.
	States a precaution to be taken to prevent damage to electronic components by electrostatic discharge.
	Informs you of fire-related cautions.
	Informs you that the plug must be removed from the power outlet before starting an operation.
NOTE	Gives useful information to understand descriptions.
 REFERENCE	Indicates sections to be read to obtain more detailed information.

II. ABOUT THIS MANUAL

This manual is divided into five parts, and contains information required for servicing the product.

Part 1: Facsimile

This section describes the facsimile function of the respective product.

Part 2: Printer

This section describes the printer function of the respective product.

Each of the above parts is further divided into the following five chapters:

Chapter 1: General Description

This part explains product specifications and the how to service the unit safely. It is very important, so please read it.

Chapter 2: Technical Reference

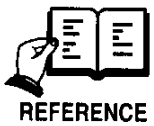
This part explains the technical theory of the product.

Chapter 3: Maintenance and Service

This part explains how to maintain the products for adjustment and troubleshooting and service operations and service switches.

Chapter 4: Appendix

This part explains the informations of the optional products and user data flow.



REFERENCE

- For more details of user operations and user reports, see the separate volume of *USER'S GUIDE.*
- Procedure for assembly/disassembly and greasing points are not given in this manual. See the illustrations in the separate volume of *PARTS CATALOG.*
- Detailed description of each SSSW/parameter is not given in this manual except the new SSSWs/parameters added to this model.
  See *G3 Facsimile Service Data Handbook (supplied separately)* for details them.
- See the *G3 Facsimile Error Code Handbook* for details of the error codes not shown in this manual.
- Detailed description of connector Locations and Signal Descriptions in not given in this manual.
  See the *Circuit Diagram* for details them.

III. REVISION HISTORY

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0	Original

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1. FEATURES

1.1 Overview

This product is a G3 transreceiving facsimile based on the ITU-T recommendation. It can be used in telephone networks.

*: This mark indicates new function.

Excellent print quality

The high-performance print head offers 360 × 360 dot per inch (dpi) resolution for text and graphics.

Automatic switching between fax and voice calls

Fax/telephone switching allows you to receive fax messages and normal phone calls on a single line.

BJ cartridge **REFER TO PAGE 2-18.**

The BC-20 and BC-21 ink cartridges provide excellent print quality for crisp, clean-looking documents.

Convenient paper handling

The paper tray holds up to 150 sheets of plain letter, legal, or A4 paper, and the automatic document feeder can hold up to 20 letter-size, A4-size or 10 legal-size pages.

Simple maintenance

The replaceable ink cartridge contains the ink and the print head. When it runs out of ink, simply replace it.

*** Simple purge structure** **REFER TO PAGE 2-13.**

The head cleaning purge structure operates by utilizing the pressure that is created when the trailer draws and squeezes the tube, and since there are no sliding parts, there is no danger of clogging.

*** Ink detection function** **REFER TO PAGE 2-16.**

This model has a new ink detection function. After each received page is printed, ink is ejected in front of a photosensor, so that the machine can detect whether there is ink remaining or not.

*** Automatic head gap adjustment** **REFER TO PAGE 2-16.**

The head gap is automatically adjusted to suit the thickness of the paper, which means that there is no need for the switching lever operation that was in earlier models.

2. SPECIFICATIONS

2.1.General Specification

Type	Desktop
Body colour	Art gray
Power source	85 ~ 132V DC, 48 ~ 62 Hz,
Power consumption	standby 8W / Max. 30 W (when 30% black copy)
Usage environment.	41.0°F ~ 90.5°F (5°C ~ 32.5°C), 10%~85% RH, 532 ~ 760 mmHg (709 ~ 1013 hPa)
	Horizontal ±3° or less
Operating noise	Measured in accordance with ISO standards
	Standby :35 dB(A) or less
	Operating :50dB(A) or less
Dimensions (W × D × H)	18.74" × 17.91" × 10.59" (476 mm × 455 × 269 mm) (Including handset)
	15.35" × 17.91" × 10.59" (390 mm × 455 × 269 mm) *(Not including handset)*
Weight	17.20 lbs (7.8 kg) Including handset
	16.53 lbs (7.6 kg) Not including handset

2.2 Communication Specification

Applicable lines	PSTN (Public Switched Telephone Network)
	PBX (Private Branch eXchange)
Applicable Services	DRPD
Handset (CFX-B380IF only)	Handset with no numeric buttons (CT-17)
Transmission method	Half-duplex
Transmission control protocol	ITU-T T30 binary protocol/ECM protocol
Modulation method	
G3 image signals	ITU-T V.27ter (2.4k, 4.8k bps)
	ITU-T V.29 (7.2k, 9.6k bps)
	ITU-T V.33 (12k, 14.4k bps)
	ITU-T V.17 (TC7.2k, TC9.6k, 12k, 14.4k bps)
G3 procedure signals	ITU-T V.21 (No.2) (300bps)
	(With automatic fallback function)
Coding	ITU-T T.4 Coding method (MH, MR)
	ITU-T T.6 Coding method (MMR)
Error correction	ITU-T T30 (ECM)
Canon express protocol (CEP)	None

Time required for transmission protocol

Protocol *1 Mode	Pre-message Protocol *2	Post-message Protocol *3 (between pages)	Post-message (after pages)
Standard/Fine	approx.12 sec.	approx.4 sec.	approx.3.5 sec.

*1 Time from when other facsimile is connected to the line until image transmission begins.
*2 Post-message (between pages): Time from after one document has been sent until transmission of the next document starts if several pages are transmitted.
*3 Post-message (after last pages): Time from after image transmission is completed until line is switched from facsimile to telephone.

Minimum transmission time	10 msec (MH,MR), 0 msec (MMR)
Transmission output level	from 0 to -15 dBm
Receive input level	from -3 to -43 dBm
Modem IC	R144EFXL

2.3 Scanner Specification

Type	Sheets	
ADF capacity	Max. 20 sheets (A4/Letter)	
	Max. 10 sheets (Legal)	
Effective scanning width	Letter/Legal	8.42" (214 mm)
	A4	8.19" (208 mm)
Scanning method	Contact sensor scanning method	
Scanning line density		
Horizontal:		8 dot/mm (203.2 dpi)
Vertical:	Standard	3.85 line/mm (97.79 dpi)
	Fine	7.7 line/mm (195.58 dpi)
Scanning speed	10 msec./line	
Image modes	Binary/Auto Halftone	
Scanning density adjustment	3 density level (only binary image mode)	
Halftone	64-gradation error diffusion system (UHQ-6)	
Prescan	None	

Scanning range

Sheet dimensions (W × L)

Maximum	8.50" × 14.01" (216 mm × 356 mm)
Minimum	8.27" × 4.13" (208 mm × 105 mm)
Thickness	
multiple pages:	0.002" ~ 0.005" (0.08 mm ~ 0.13 mm) 40~90 g/m2
single page:	0.002" ~ 0.012" (0.06 mm ~ 0.30 mm) 34.7~240 g/m2

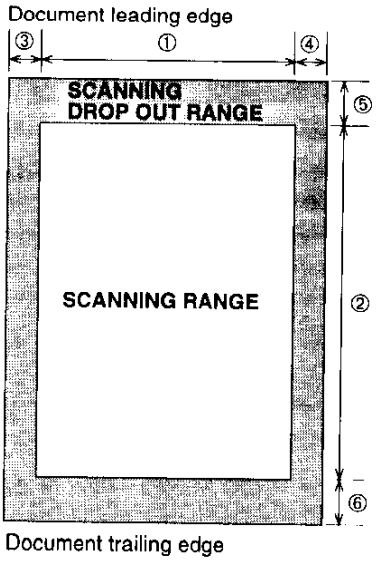


Figure 1-1 Scanning Range

Item	A4	Letter	Legal
① Effective scanning width	8.09"~8.18" (205.5~208 mm)	8.33"~8.42" (211.5~214 mm)	8.33"~8.42" (211.5~214 mm)
② Effective scanning length	no specified	no specified	no specified
③ Left margin	0.04" ±0.14" (1.0 mm ±3.5 mm)	0.04" ±0.14" (1.0 mm ±3.5 mm)	0.04" ±0.14" (1.0 mm ±3.5 mm)
④ Right margin	0.04" ±0.14" (1.0 mm ±3.5 mm)	0.04" ±0.14" (1.0 mm ±3.5 mm)	0.04" ±0.14" (1.0 mm ±3.5 mm)
⑤ Top margin	0.08" ±0.08" (2.0 mm ±2.0 mm)	0.08" ±0.08" (2.0 mm ±2.0 mm)	0.08" ±0.08" (2.0 mm ±2.0 mm)
⑥ Bottom margin	0.08" ±0.08" (2.0 mm ±2.0 mm)	0.08" ±0.08" (2.0 mm ±2.0 mm)	0.08" ±0.08" (2.0 mm ±2.0 mm)

Units are inches with mm shown in parentheses.

NOTE

Document scanning width "**A4/LTR**" is set in service data #1 SSSW SW06, bit4.

2.4 Printer Specification

Printing method	Bubble-jet ink on-demand	
BJ Cartridge		
Products name	BC-20 Black BJ cartridge/BC-21 Color BJ cartridge	
Product code	F45-0561/F45-0571	
Print head	128 nozzles/136 nozzles (Y:24, M:24, C:24, Bk:64)	
Ink cartridge (Ink tank)	None/BCI-21 Color or BCI-21 Black	
Valid period	1 year/half a year (since the seal was opened)	
Storage conditions	Temperature	32.0°F ~ 95.0°F (0°C ~ 35°C)
	Humidity	35% ~ 85% RH
Ink Cartridge		
Products name	BCI-21 Black Ink Cartridge/BCI-21 Color Ink Cartridge	
Product code	F47-0731/F47-0741	
Ink contains	9 ml/5 ml each of YMC	
Ink detection	Yes (Directly detects ink ejection)	
Printing speed	Approx. 4 pages/minute (HQ mode)	
Printing resolution	360 dpi × 360 dpi (Normal print)	
	180 dpi × 180 dpi (Economy print*)	
*Printing in a checkered pattern without printing vertical and horizontal adjacent dots.		
Paper output tray stacking	Approx. 100 sheets (when using the recommended paper)	
Paper tray		
Paper supply method	ASF (Auto Sheet Feeder)	
Number of paper tray	1tray : Legal/Letter/A4 (Universal)	
Paper capacity	Max. 0.59" (15 mm) thickness	
	plain paper (Approx. 150 sheets)	
Recommended paper		
Canon Copier LTR/LGL Premium Paper		
Weight	75 g/m²	
Paper size	Letter, Legal	
Manufactured by	BOISE CASCADE	
PLOVER BOND		
Weight	75 g/m², 90 g/m²	
Paper size	Letter	
Manufactured by	FOX RIVER	
XEROX 4024		
Weight	75 g/m², 90 g/m²	
Paper size	Letter, Legal	
Manufactured by	XEROX	

Printing range

Paper dimensions (W × L)

Letter	8.50" × 10.98" (216 mm × 279 mm)
Legal	8.50" × 14.02" (216 mm × 356 mm)
A4	8.27" × 11.69" (210 mm × 297 mm)

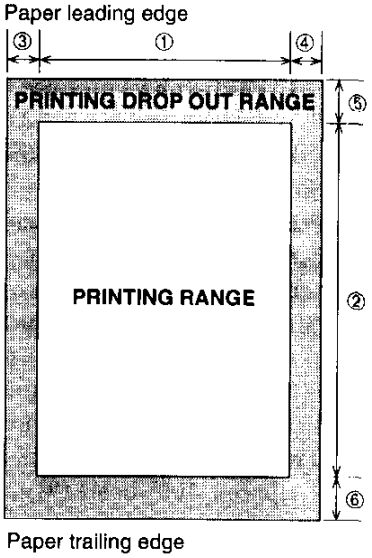


Figure 1-2 Printing Range

Item	A4	Letter	Legal
① Effective printing width	8.00" (203.2 mm)	8.00" (203.2 mm)	8.00" (203.2 mm)
② Effective printing length	11.20" (284.4 mm)	10.51" (267.0 mm)	13.47" (342.1 mm)
③ Left margin	0.13"±0.06" (3.4±1.5 mm)	0.25"±0.06" (6.4±1.5 mm)	0.25"±0.06" (6.4±1.5 mm)
④ Right margin	0.13"±0.06" (3.4±1.5 mm)	0.25"±0.06" (6.4±1.5 mm)	0.25"±0.06" (6.4±1.5 mm)
⑤ Top margin	0.12"±0.10" (3.0±2.5 mm)	0.12"±0.10" (3.0±2.5 mm)	0.12"±0.10" (3.0±2.5 mm)
⑥ Bottom margin	0.27"±0.10" (7.0±2.5 mm)	0.27"±0.10" (7.0±2.5 mm)	0.27"±0.10" (7.0±2.5 mm)

Units are inches with mm shown in parentheses.

NOTE

- The header and footer are printed in the printing range.
- The shaded area is included in the left and right margin errors of the paper trailing edge.
- ②, ⑤, ⑥ represent the vertical direction printing drop out range, and printing range 0.71" (18mm) or less.
- The printing range is set in user data "**FAX PRINTER SETTING**", "**SELECT PAPER SIZE**".

2.5 Copy Specifications

Color copy	None	
Multiple copy	99 copies	
Copy resolution		
	Scanning	360 dpi × 360 dpi (AUTO HALFTONE) 8 line/mm × 360 dpi (Binary) (UHQ-6 smoothing)
	Printing	*360 dpi × 360 dpi*
Copy magnification ratio	Auto reduction (100%~70%)	

2.6 Function

Dialling	
Manual dialling	Numeric button
Auto dialing	Max. 120 digits MultiPASS C2500:One-touch:16, Coded speed:90, Numeric button:1 CFX-B380IF:One-touch:16, Coded speed:100, Numeric button:1
Group dial	MultiPASS C2500: Max.105 locations CFX-B380IF: Max.115 locations
Redial	Numeric button redial function (Max. 120 digits)
Transmission	
Broadcast transmission	
MultiPASS C2500:	Max. 107 locations (One-touch:16, Coded speed:90, Numeric button:1)
CFX-B380IF:	Max. 117 locations (One-touch:16, Coded speed:100, Numeric button:1)
Delayed transmission	
MultiPASS C2500:	Max. 107 locations, Max. 1 designated time
CFX-B380IF:	Max. 117 locations, Max. 1 designated time
Confidential Tx/Rx	None
Relay broadcasting originating	None
Relay broadcasting	None
Reception	
Dual Access	Yes
FAX/TEL switching	Yes
Method	CNG, ROT(Re-Order Tone) detection
Message	None
Pseudo CI	None
Pseudo ring	Yes
Pseudo ringback tone	Yes
Reduction settings for reception	Yes
Automatic reduction of reception images	Yes
Built-in Answering machine	None
Answering machine connection	Yes (Telephone answering priority type)
Remote reception	Yes (Remote ID method)
Memory lock reception	None
Reception printing in reverse order	None
Polling	
Polling transmission	None
Polling reception	Yes (Canon mode only)
Polling ID	3-digits decimal password ("255" fixed)

Others	
Closed network	None
Direct mail prevention	Yes (compared Lower 6 digits)
Reception printing in reverse order	None
Memory box	None
Memory backup	
Backup contents	Dial registration data, User data, Service data, Time
Backup IC	256 kbit SRAM for control, 64 kbit SRAM for imageprocessing
Backup device	Lithium battery 3.0V DC/560 mAh
Battery life	Approx.. 5 years
Image data backup	
Backup contents	Memory reception, Delayed transmission and Broadcast transmission image data, Activity management report
Backup IC	4 Mbit DRAM × 2
Backup device	Electric double layer capacitor 5.5 V DC/1.0 F
Battery life	No deterioration of battery life caused by recharging.
Backup time	One hour
Activity management	Yes

a) User report

Activity management report (Every 40 transactions : Can be separated into transmission and reception)
Activity report (sending/receiving)
One-touch speed dialling list
Coded speed dialling list
Group dialling list
Memory clear list
Transmission reserve list
Document memory list
User's data list
Multi activity report

b) Service report

System data list
System dump list
Error list

Transmitting terminal identification	Yes
Time	
Management data	Year/month/date/day/hour/minute (24 hour display)
Precision	±30 sec per month
Display	2rows × 20 digits
Completion stamp	None
Program key	None
Telephone exchange function	None
Speaker phone	None
Demo print function	Yes (MultiPASS C2500 only)
HELP function	Yes

3. OVERVIEW

3.1 External View

Front View

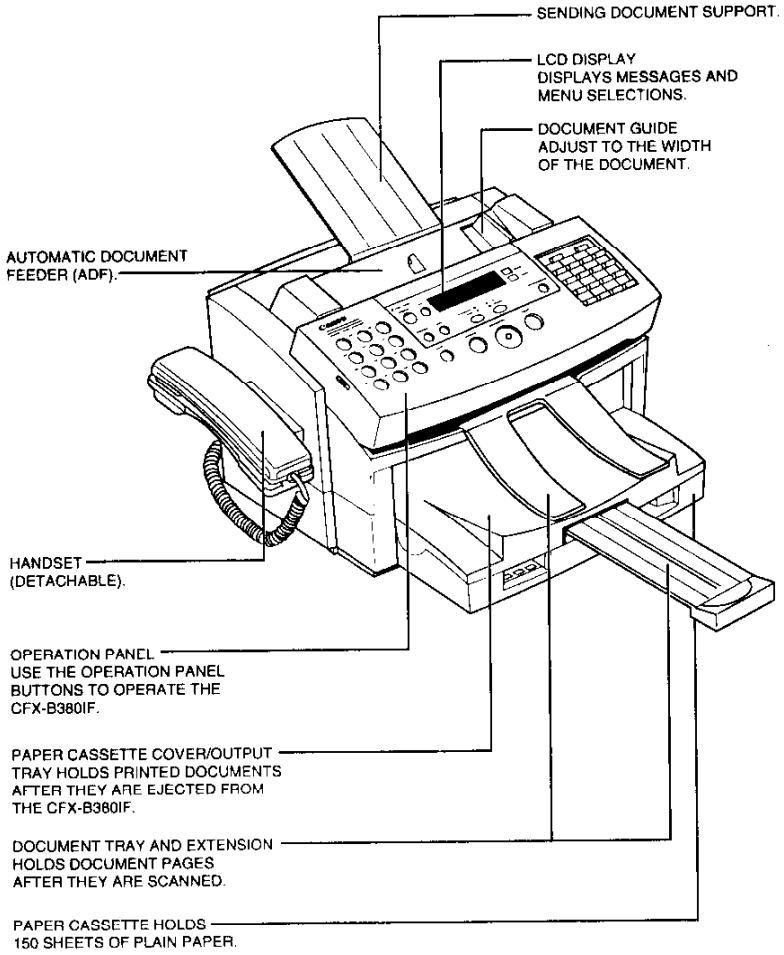
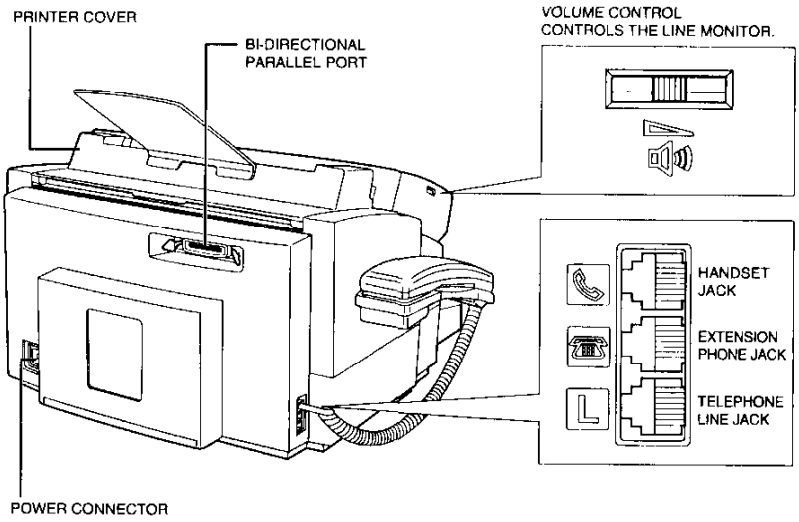


Figure 1-3 External View (1)

NOTE

For the switches and jumper plugs used for servicing, refer to *Chapter 3: 5.1 Hardware Switches on Page 3-32.*

Rear View



Inside the Paper Cassette

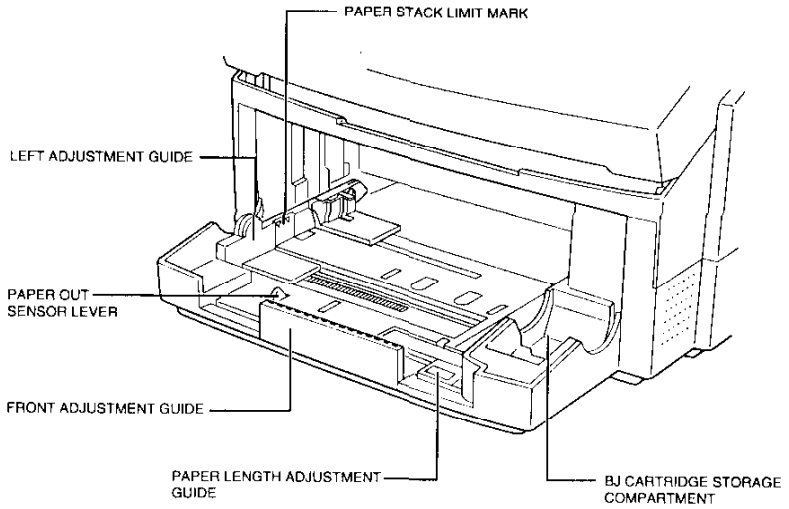
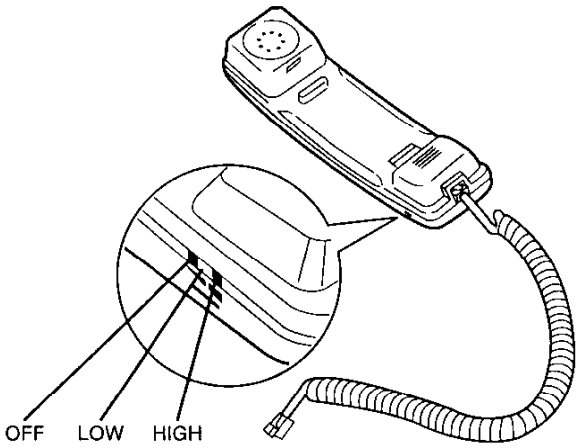


Figure 1-4 External View (2)

Handset (CFX-B380IF only)

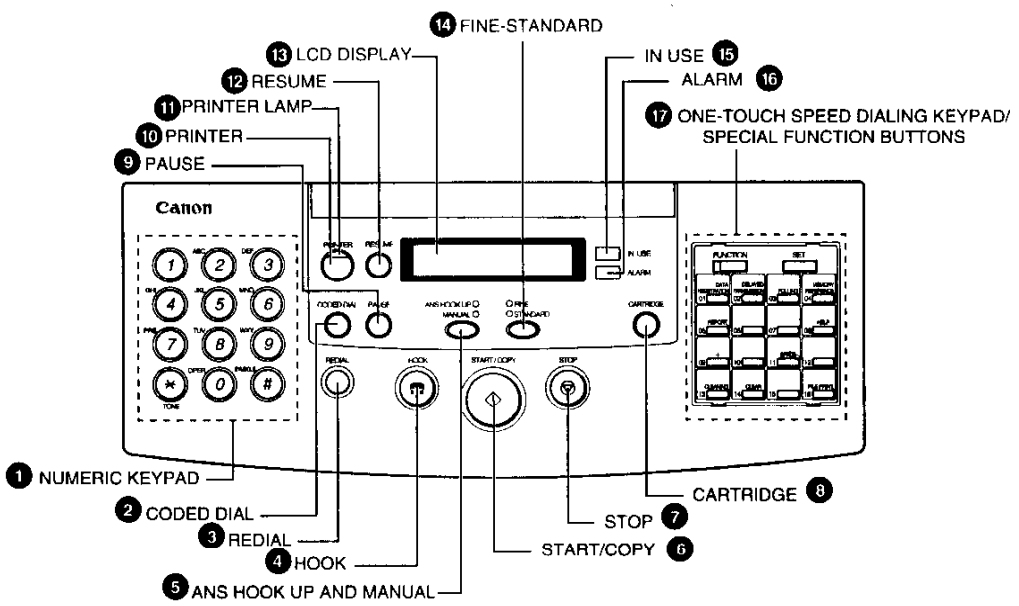


Ringer Volume Switch

Adjust the volume of the telephone line ringer. There are three settings: HIGH, LOW and OFF. Use a pen or other pointed object to adjust the switch.

Figure 1-5 Handset

3.2 Operation Panel



1 Numeric Keypad
Use these buttons to enter numbers and names when registering information and to dial fax/telephone numbers that are not registered for automatic dialing.

2 CODED DIAL button
Press this button once (followed by a two-digit code) to dial a fax/telephone number registered for coded speed dialing.

3 REDIAL button
Press to dial the previous number dialed with numeric buttons.

4 HOOK button
Press to engage or disengage the telephone line (hands-free dialing).

Figure 1-6 Operation Panel (1)

❺ **ANS HOOK UP and MANUAL button**
When both lamps are off, the fax is set for automatic receiving. Press and light ANS HOOK UP when an answering machine is connected. Press and light MANUAL for manual document receiving.

❻ **START/COPY button**
Press to start sending, receiving, copying, and other operations.

❼ **STOP button**
Press to cancel sending, receiving, or registering data, or to cancel any other operation.

❽ **CARTRIDGE button**
Press to move the cartridge holder to the center position. (When replacing the BJ cartridge.)

❾ **PAUSE button**
Press to enter pauses between digits when dialing or registering facsimile numbers.

❿ **PRINTER button**
Press to turn the printer mode on or off.

⓫ **PRINTER lamp**
Lights when the printer mode is on.

⓬ **RESUME button**
Press to form feed paper (in printer mode).

⓭ **LCD Display**
Displays messages and prompts during operation. Displays selections, text, numbers and names when registering information.

⓮ **FINE-STANDARD button**
Use to set resolution for the type of document you want to send.

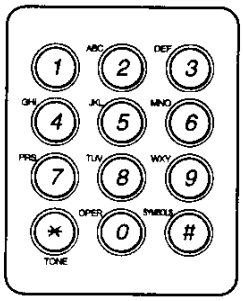
⓯ **IN USE lamp**
Lights when your fax is using the telephone line.

⓰ **ALARM lamp**
Flashes when an error occurs, when the CFX-B380IF is out of paper or ink, or when received documents are stored in memory.

⓱ **One-Touch Speed Dialing Keypad/Special Function buttons**
Use these buttons for one-touch speed dialing and to perform special operations.

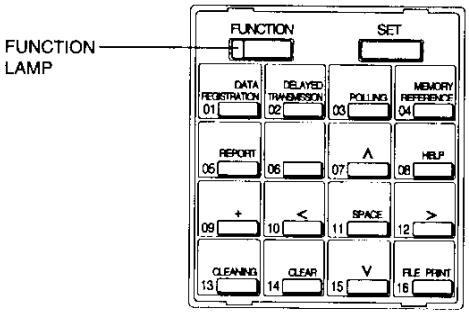
Figure 1-7 Operation Panel (2)

Numeric Keypad



Use the numeric keypad to enter phone numbers when dialing. These buttons can also be used to enter text, numbers, and symbols when registering names.

One-Touch Speed Dialing Keypad



- **FUNCTION button**
  Use to select special functions such as Data Registration and Polling. The function lamp must be lit to select these functions.

- **SET button**
  Use to accept special function settings and activities.

Figure 1-8 Operation Panel (3)

The following buttons perform special operations when the FUNCTION lamp is on:

- **DATA REGISTRATION button 01**
  Press to start data registration for facsimile numbers, names, and other important settings for sending, receiving, and printing.
- **DELAYED TRANSMISSION button 02**
  Press to send a document at a preset time.
- **POLLING button 03**
  Press to request other fax machines to send documents.
- **MEMORY REFERENCE button 04**
  Use to print a document or a list of documents in memory, or to resend or delete documents stored in memory.
- **REPORT button 05**
  Use to print activity reports.
- **Search buttons (∧, ∨) 07 and 15**
  Use to scroll through selections during data registration.
- **Cursor buttons (<, >) 10 and 12**
  Use to move the cursor during data registration.
- **HELP button 08**
  Use to print a help list.
- **+ button 09**
  Press to enter a + in your facsimile number.
- **SPACE button 11**
  Press to enter a space between numbers or letters when you register facsimile numbers and names.
- **CLEANING button 13**
  Use to clean the BJ cartridge print head whenever print quality deteriorates.
- **CLEAR button 14**
  Press during data registration to clear a number or name so you can re-enter it.
- **FILE PRINT button 16**
  Press to print documents that are stored in memory for uploading to your computer. (Once you print the file, it is erased from memory and cannot be uploaded to your computer.)

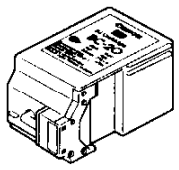
Figure 1-9 Operation Panel (4)

3.3 Consumables

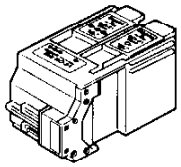
3.3.1 BJ cartridge and ink cartridge

Canon offers the following BJ cartridges and ink cartridges. (Note that BJ cartridges contain the Bubble Jet print head and ink cartridges, while ink cartridges contain ink only.)

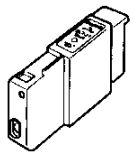
BC-20 Black BJ Cartridge
Incorporates a Bubble Jet print head and black ink. Use this cartridge for receiving faxes, making copies, and for your monochrome printing.



BC-21 Color BJ Cartridge
Incorporates a Bubble Jet print head and two replaceable ink cartridges: a black ink cartridge (BCI-21 Black) and a color ink cartridge (BCI-21 Color). One BC-21 cartridge comes with the CFX-B380IF. Use this cartridge when you plan to print in color.



BCI-21 Black Ink Cartridge
Purchase this ink cartridge from a dealer as the black ink runs out of the BC-21 Color BJ cartridge.



BCI-21 Color Ink Cartridge
Purchase this ink cartridge from a dealer as the color (cyan, yellow, magenta) ink runs out of the BC-21 Color BJ cartridge.

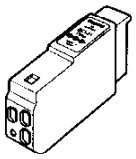


Figure 1-10 Consumables (1)

3.3.2 Print media

Canon manufactures the following print media.

Canon Coated Paper LC-101
This coated paper is specially designed for your Canon Printer, which will produce sharp and vivid color output on this high-grade matte paper. The coating used on this paper is a unique formula that ensures full compatibility with your Canon color inks. Use this paper for your printed output that requires crisp color rendering on a high quality, nonglossy paper. Letter, legal, and A4 sizes are available.

Canon Transparencies CF-102
These overhead clear transparencies (also called Over Head Projection or OHP film) are specially designed for Canon Printer System. Other overhead clear transparencies may cause problems in your Canon Printer by either not feeding correctly into the unit or by not allowing the inks to dry properly. Use these clear transparencies to produce crisp and professional overhead presentations. Letter size only is available.

Canon Back Print Film BF-102
This unique glossy paper allows you to print extremely high quality color output such as photographic images and graphics. This output can be viewed either by rear illumination, such as a light box, or as regular prints without the benefit of a light box. Back print film is a mylar-based translucent sheet. When viewed by a light box, back print film provides a sharp, bright, and vivid presentation of special items such as photographs, portraits, and graphics. It is also great for trade show displays and other special presentations when rear-illuminated. Letter size only is available.

Canon High Gloss Film HG-101
The Printer can produce sharp and brilliant color output on this high grade gloss film, which is fully compatible with your Canon color inks. Use this film for trade show displays or other special presentations, and when printing at 720 × 360 dpi. You can create sharper and more vivid color output with the high gloss film than with the coated paper. Letter size only is available.

Fabric Sheets FS-101
These fabric sheets are specifically designed for Canon Printer You can create your own cross stitch designs, pillows, holiday stockings, and other imaginative craft and sewing projects. Legal size is available.

Figure 1-11 Print Media (1)

Canon Bubble Jet Paper LC-301 (water resistant)
Canon Bubble Jet Paper is a water-resistant paper that has been specially developed for color printing with Canon Printer Images printed on the Bubble Jet paper are bright, vivid and will not run should water or other liquids be spilled on them. Images printed on this Canon Bubble Jet Paper will stand up to normal office highlighters, unlike images printed on other papers. This special Bubble Jet paper is printable on both sides and is available in letter size only.

T-Shirt Transfers TR-101
This special sheet allows you to create a unique design and then use it to personalize a T-shirt, sweatshirt, apron, table cloth, napkin, canvas tote bag, or other fabric items. You can use the transfer on any cotton or cotton/poly blend fabric. Letter size is available.

Figure 1-12 Print Media (2)

4. DIMENSIONS

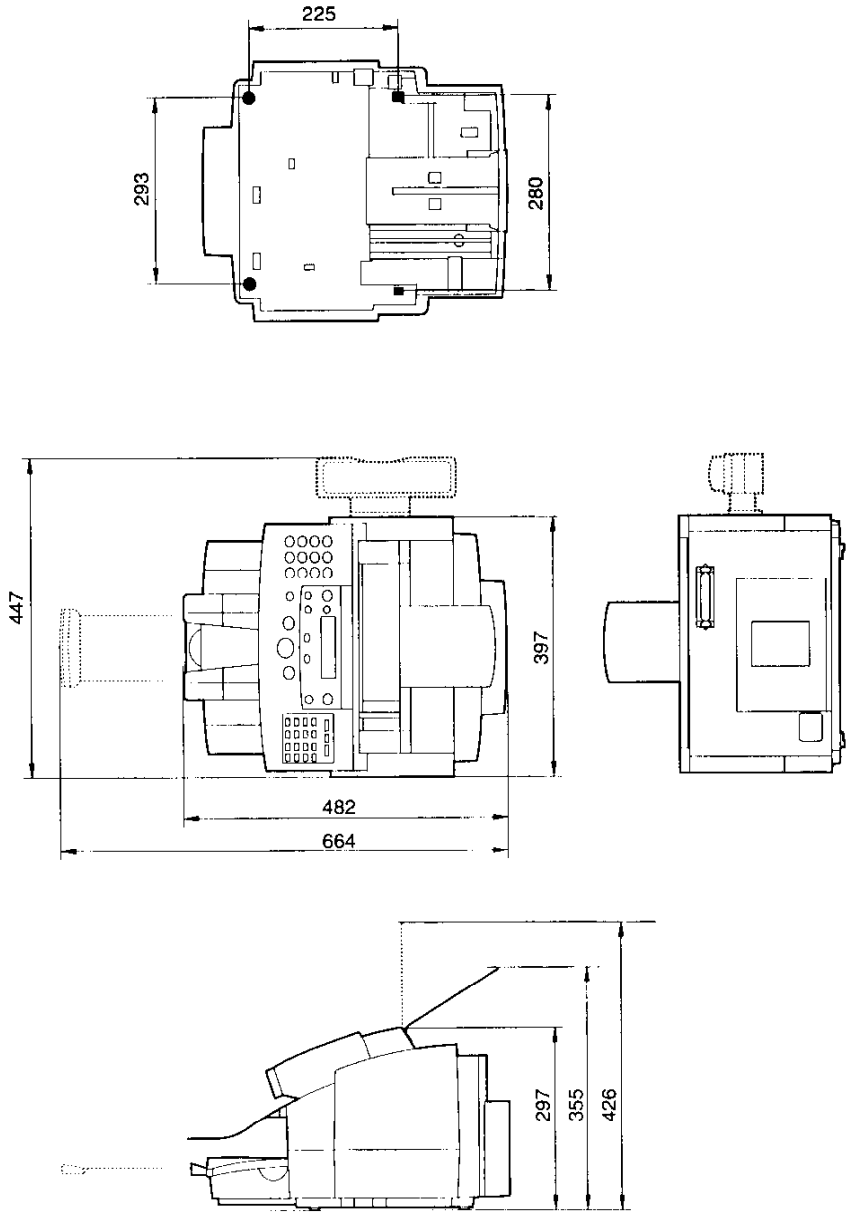


Figure 1-13 Dimensions

5. SAFETY & PRECAUTIONS

5.1 Personnel Hazards

Electrical Shock and High-Temprature Parts

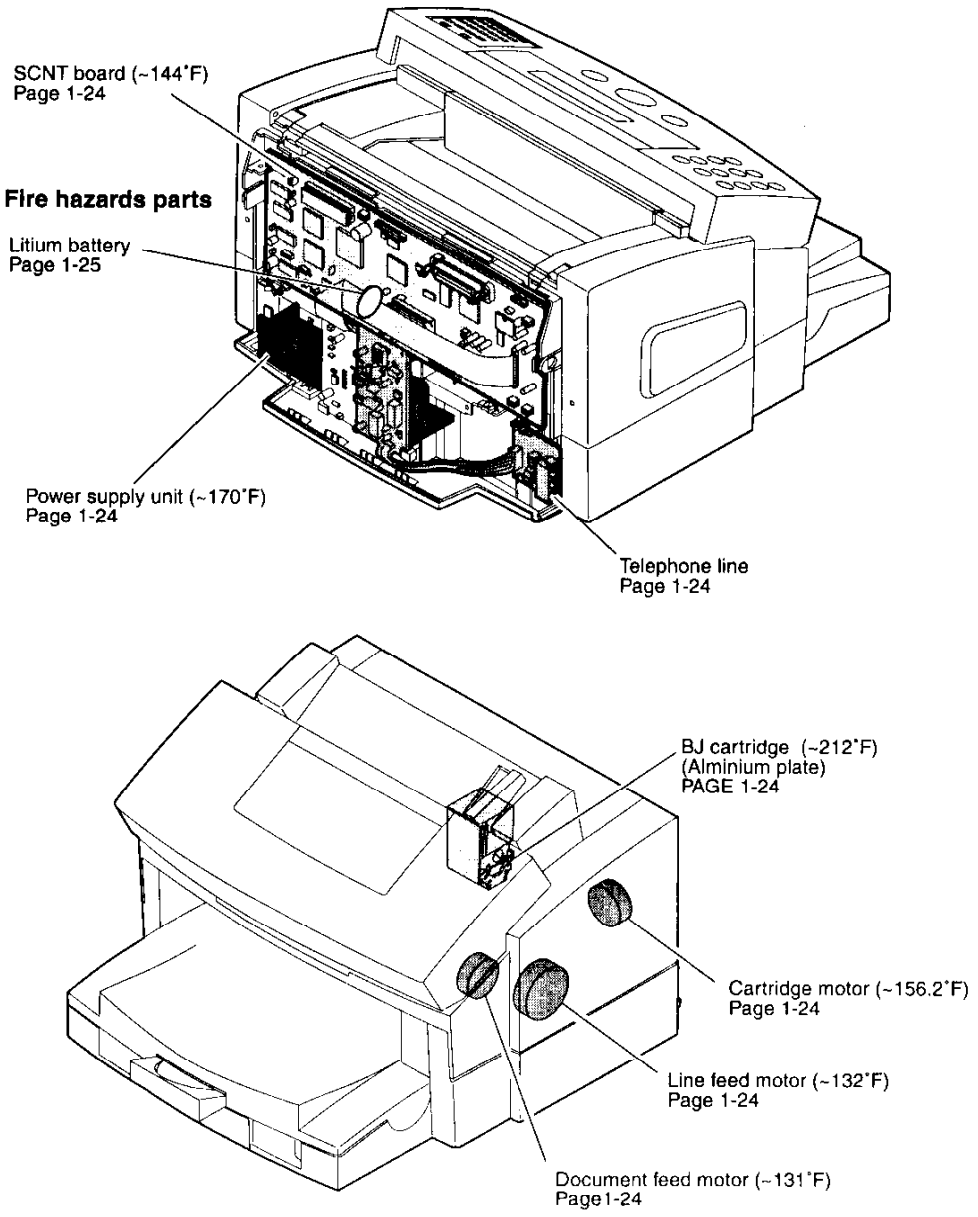
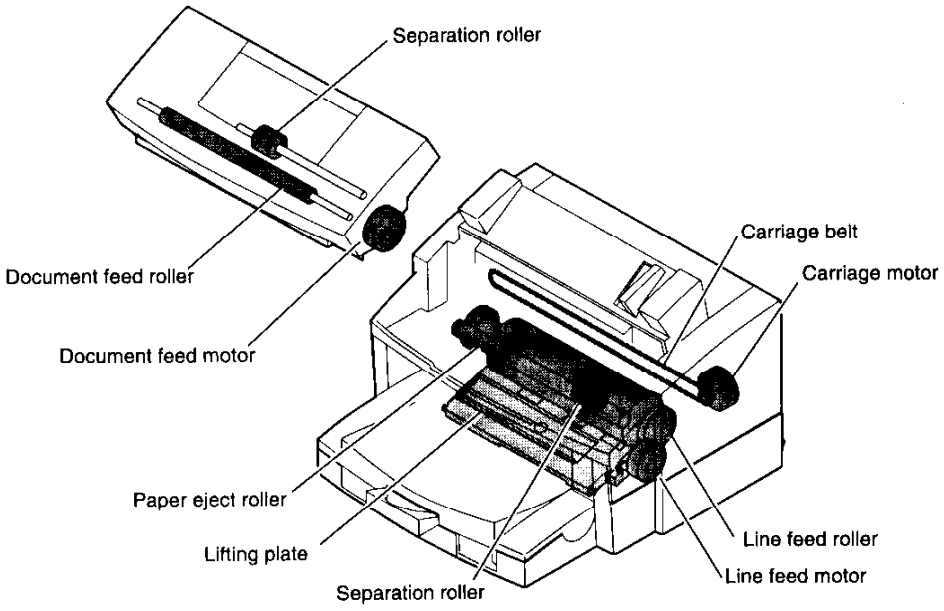


Figure 1-14 Personnel Hazards (1)

Moving parts ☞ Page1-25



Preventing ink stains ☞ Page1-25

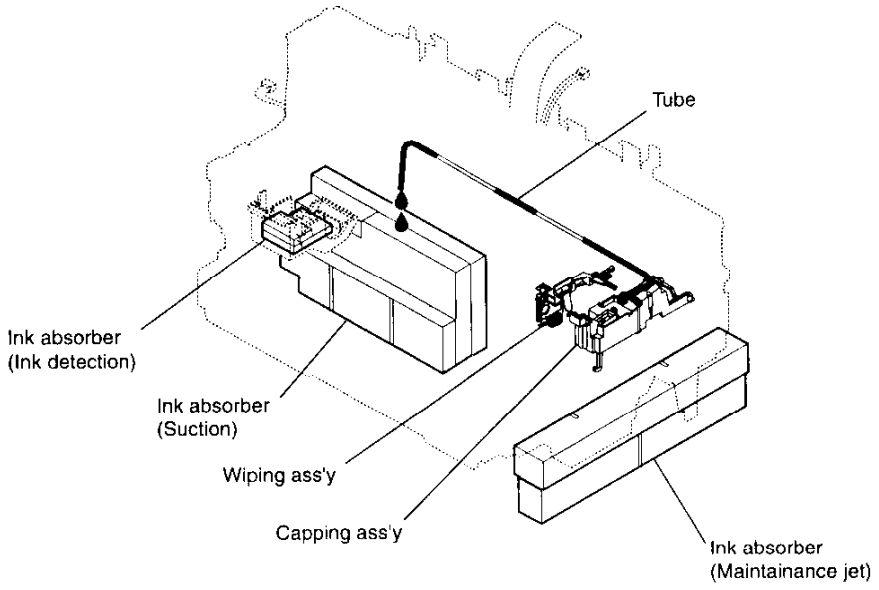


Figure 1-15 Personnel Hazards (2)

5.1.1 Electrical shock

Electrical shock hazard

- To prevent electrical shock, be sure to disconnect the power cord and modular jack before disassembly.
- Remove grounding wrist straps before servicing this unit while the FAX's power is on. Otherwise, electrical shock may occur.

NOTE

Power supply unit

When power is supplied to this unit, 120 VAC will be supplied to the primary side.

Telephone line

If a telephone line is connected to this unit, 48 VDC will be supplied by this line. When a call signal is received, a voltage of 90 VAC Vrms will be supplied.

5.1.2 High-temperature parts

High-temperature warning

To prevent skin burns, disconnect the power cord and let this unit stand for at least 10 minutes to allow hot parts to cool.

NOTE

How to treat burns

Heat of about 122°F or more causes burns. Also, the longer the contact, the more severe the burn.

When treating a burn, the first minute after receiving the burn is the most important. Cool the burn immediately with cold running water. In case of a serious burn, seek medical attention immediately.

NOTE

The parts which get hot during operation are indicated. For the location of these parts, refer to the figures.

(Ambient temparature 95°F (35°C) continuous copy operation)

Document feed motor (approx. ~ 131°F (55°C))
Line feed motor (approx. ~ 132°F (56°C))
Carriage motor (approx. ~ 156.2°F (69°C))
Power supply unit (approx. ~ 170°F (77°C))
SCNT board assembly (approx. ~ 144°F (55°C))
BJ cartridge (max. ~ 212°F (100°C))

5.1.3 Fire hazards

Do not dispose in fire.

Do not dispose of lithium batteries in fire. Doing so may rupture the battery and expose flammable materials.

Follow applicable local regulations when disposing of the the SCNT board assembly's lithium battery.

Fire hazard

When using IPA or other solvents during servicing, heat or sparks from internal electronic circuits can ignite the solvent. Before using such solvents, be sure to turn off the power source and wait until the high-temperature parts cool. Use the solvent in a well-ventilated area.

5.1.4 Moving parts

Moving parts

To prevent mishaps due to moving or rotating parts during servicing, be sure to disconnect the power cord before disassembly.

Since the this unit does not have a sensor on the printer cover, the carriage and rollers will not stop even if the printer cover is opened during a printing operation. If the printer cover must be opened during printing, beware of the moving parts.

Figure 1-15 shows the driving section's location.

5.1.5 Preventing ink stains

Avoid touching the BJ cartridge ink nozzles, ink pad, head cap, head wiper, ink tube, and ink absorbers. The ink can stain your hands, clothes, etc. Although the ink is water soluble, it is permanent and will permanently stain clothing, etc.

NOTE

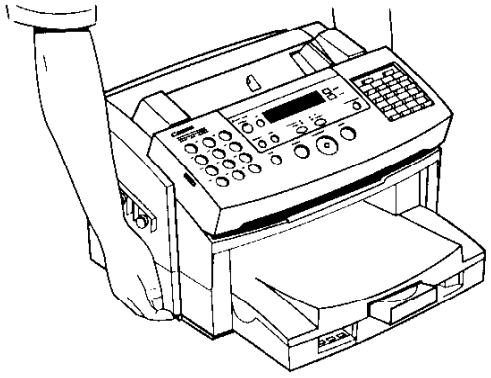
Although the ink is not toxic, it contains an organic solvent (isopropyl alcohol 67-63-0). If the ink enters the eyes accidentally, flush the eyes with running water and see a doctor. If the ink is swallowed accidentally, see a doctor immediately and give the information printed on the BJ cartridge label.

5.2 General Cautions
5.2.1 Unit cautions

General

Make sure the place where you set up the printer satisfies the following conditions:

- ❑ Use the printer only within the following ranges of temperature and humidity.
  - Ambient temperature: 50°F to 90.5°F (5°C to 35°C)
  - Ambient humidity: 10% to 90% RH (no condensation)
  - Keep your printer out of direct sunlight, as this can damage the unit.
- ❑ Do not lift the printer by the handset cradle.
- ❑ Do not lift the printer by the operation panel.
- ❑ Hold the printer as shown when transporting it.



- ❑ Place the printer on a flat, sturdy, vibration-free surface.
- ❑ Do not remove the BJ cartridge from the printer until it has to be replaced or when transporting the printer. If the cartridge print head is left unprotected, it will dry out and you may not be able to use it.

Note

- ❑ Do not install the printer near devices that contain magnets or generate magnetic fields. (Such as speakers).
- ❑ Do not subject the printer to strong physical shock or vibration.
- ❑ Make sure the area is free from dust.
- ❑ Keep the printer clean. Dust accumulation can prevent the printer from operating properly.

Other

- ❑ Here are some other general precautions when you are using the printer or working around it.

Caution

- ❑ Avoid installing your printer in places exposed to direct sunlight, dust, vibration, high temperature or humidity, or on unstable surfaces.
- ❑ To assure proper electrical contact, make sure the printer is firmly plugged in.
- ❑ Never pull on the cord to unplug the printer. Pull on the plug itself.

Warning

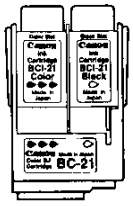
- Do not overload the electrical outlet where the printer is plugged in.
- Never plug or unplug the printer when your hands are wet.
- For your safety, unplug the printer during electrical storms.
- If you have problems with the printer (such as smoke, odd smells, or noises), immediately unplug the printer from the outlet. Keep the area around the outlet free from clutter so you can unplug the printer quickly in case of an emergency.
- Never use liquids or drink beverages around the printer. Liquids spilled on the printer can cause a fire or electrical shock. If you accidentally spill a liquid on the printer, unplug it immediately and call your authorized Canon dealer's service representative.
- To avoid electrical shock from exposed power points, never disassemble the printer. There are no parts or switches in the printer that require adjustment.

5.2.2 BJ cartridge cautions

a) General cautions

BJ Cartridge Guidelines

You can use either the BC-21 or BC-20 BJ cartridge with the printer. The BC-21 Color BJ cartridge contains both color (cyan, magenta, yellow) and black ink; the BC-20 Black BJ cartridge contains black ink only. Use the BC-20 Black BJ cartridge when you plan to print with black ink only.



The actual amount of ink that you use will vary depending on the print density of a page. If the majority of your output is graphics, you may need to change cartridges more often than when you are printing text only.

You may need to replace the BJ cartridge when any of the following conditions exist:

- ❑ You have been using the cartridge for over one year.
- ❑ Your printed output is not crisp and clear, and there are gaps in the characters (missing dots) even after you have cleaned the print head at least five times.

If you are using the BC-21 Color BJ cartridge and your output is blank, one of the ink cartridges is probably out of ink.

Caution

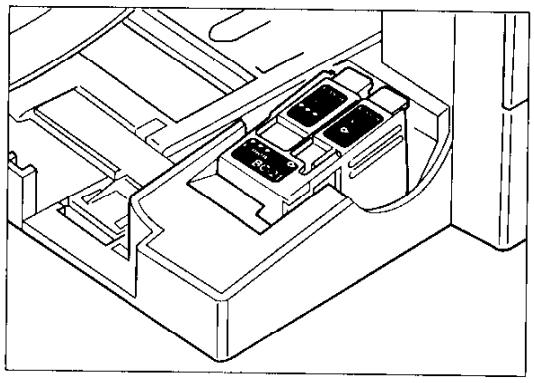
Canon makes numerous BJ cartridges; the BC-21 Color BJ cartridge and the BC-20 Black BJ cartridge are designed specifically for the printer and are the only ones Canon recommends that you use. The BCI-21 Color and BCI-21 Black ink cartridges are designed specifically for the BC-21 Color BJ cartridge and are the only ones Canon recommends that you use in this cartridge.

BJ Cartridge and Ink Cartridge Maintenance

The most important thing you can do to extend the life of your printer and to ensure optimum print quality is take care of the BJ cartridges.

To ensure excellent print quality, follow these guidelines for maintaining the BJ cartridges:

- ❑ If you are using both the BC-21 Color BJ cartridge and the BC-20 Black BJ cartridge, make sure you store the cartridge not being used in the BJ cartridge storage compartment located on the right side of your printer paper cassette, as shown below.

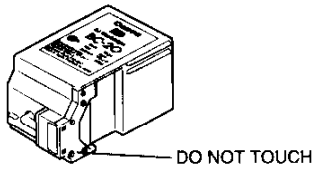


- ❑ Store BJ cartridges and ink cartridges at room temperature.
- ❑ Keep BJ cartridges and ink cartridges in their sealed containers until you are ready to use them.
- ❑ Install the BJ cartridge in the printer immediately after opening the sealed container.
- ❑ Keep the BJ cartridge in its home position (right side of the printer area) when you are not printing. Leaving it out of its home position will cause the print head to dry out.
- ❑ Perform the print head cleaning when your print quality is not satisfactory.
- ❑ Replace the BJ cartridge or an ink cartridge when the print quality does not improve after five consecutive print head cleaning.

- ❑ Do not remove the ink cartridges from the BC-21 Color BJ cartridge unnecessarily. This may cause the ink to clog.
- ❑ Make sure both ink cartridges are installed in the BC-21 Color BJ cartridge. Attempting to use the BC-21 Color BJ cartridge with one ink cartridge only may cause ink clogging.
- ❑ If spilled, the ink is difficult to remove. **Therefore, it's a good idea to keep the BJ cartridges and ink cartridges out of the reach of children.**
- ❑ Do not touch the print head area on the BJ cartridge. Ink may leak out and cause stains.

Caution

Hold the BJ cartridge on the sides only. Do not touch the silver plate on the bottom of the BJ cartridge, or the silver metal or circuit area on the side. The metal area may become hot during printing.



To avoid spilling ink, follow these precautions:

- ❑ Do not attempt to disassemble or refill a BJ cartridge or an ink cartridge.
- ❑ Do not vigorously shake a BJ cartridge or an ink cartridge while handling it.
- ❑ Do not insert anything into the opening on a BJ cartridge or an ink cartridge.
- ❑ Do not unpack a BJ cartridge or an ink cartridge until you are ready to install it.
- ❑ Do not remove a BJ cartridge or an ink cartridge unless you need to replace it.

Using Ink

Ink formulation is the most critical component of Bubble Jet printing. The ink you use must meet these guidelines:

- ❑ It must be able to be heated and cooled over 6,000 times per second without clogging.
- ❑ It must dry very quickly without bleeding into other colors.
- ❑ It must work with different media and software, while providing correct color matching with the printer driver.
- ❑ It must be environmentally friendly.

Canon has more engineers dedicated to creating quality ink for providing the best results for output on Bubble Jet printers than any other organization. Canon does not prohibit the use of third-party inks and the use of third-party inks does not invalidate the product's limited warranty. However, Canon cannot guarantee the quality or performance of your unit when you are using inks from other suppliers.

Canon's limited warranty does not cover damage caused to Canon's Bubble Jet products that is attributable to the use of third party parts or supplies, including inks. The limited warranty remains in effect for its life once that particular damage has been properly repaired.

For optimum printing results, Canon recommends that you use only the Canon BC-21 Color BJ cartridge or the Canon BC-20 Black BJ cartridge.

When replacing ink cartridges in the BC-21 Color BJ cartridge, Canon recommends that you use only Canon BCI-21 Color ink cartridge and BCI-21 Black ink cartridge.

Please use the BC-20 Black BJ cartridge for fax receiving and for printing reports.

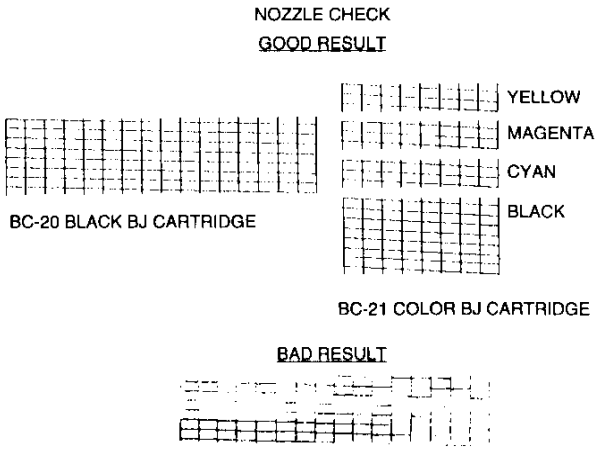
Replacing the BJ Cartridge

In normal use, you will occasionally need to replace your printer's BJ cartridge or one of its ink cartridges. How often you'll need to do this depends on the type of printing you do: if you print a lot of graphics, you may need to change cartridges more often than if you mainly print text.

- You should replace the BJ cartridge at least once a year, or whenever printed output is not crisp and clear and shows gaps (missing dots) in the characters even after you have cleaned the print head for five consecutive times as described in "Cleaning the BJ Cartridge Print Head," earlier in this chapter.
- If you are using the BC-21 Color BJ cartridge and your output is blank, one of the ink cartridges is probably out of ink and needs to be replaced. See "Replacing an Ink Cartridge in the BC-21 Color BJ Cartridge" later in this chapter for instructions.
- If the message REPLACE CARTRIDGE appears in the display, the BJ cartridge may have run out of ink (the message also appears when the CFX-B380IF has received a fax in its memory). If this message appears, do the following:

  A. Press **START/COPY**. Any fax in memory will then print. If the print is normal, you don't need to replace the BJ Cartridge; if the print is light or shows gaps, go to B.

  B. If there was no fax in memory, or if the fax's print was light or showed gaps, do the following: Press **FUNCTION**, press **DATA REGISTRATION**. Use ∧ or ∨ to select **7. SYSTEM SETTINGS**. Press **SET**. Use ∧ or ∨ to select **TEST PRINT**. Press **SET**. Use ∧ or ∨ to select **NOZZLE CHECK**. Press **SET**. A test pattern will print. If the test pattern is light or blank or shows gaps, replace the cartridge. Below is the result of the "Nozzle Check" tests.



When replacing BJ or ink cartridges, always follow the precautions and cartridge selection guidelines.

b) Unpacking the BJ cartridge

Do not open the BJ cartridge packaging unless you are ready to install the new BJ cartridge. Before installing the BJ cartridge, gently remove the orange head cap and the white protective tape from the nozzles.

NOTE

Storing an opened BJ cartridge

If the BJ cartridge packaging has been opened and the BJ cartridge is not to be installed immediately, store the cartridge in the BJ cartridge storage compartment located on the right side of your FAX's paper tray, to prevent the printing head from drying out and clogging.

As much as possible, do not open the packaging until the BJ cartridge is to be installed immediately.

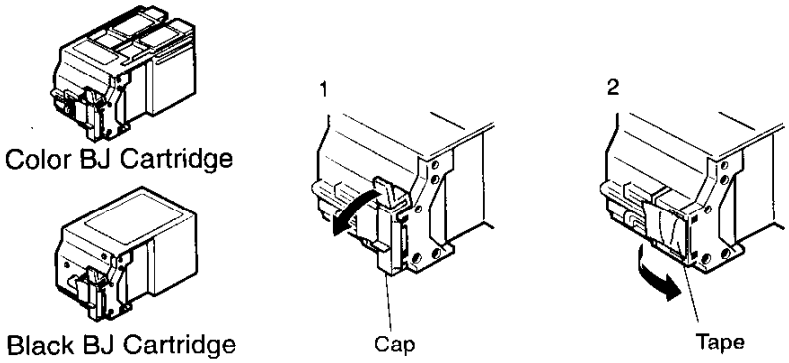


Figure 1-16 Unpacking the BJ Cartridge

c) Protecting the ink nozzles

Do not touch or wipe the ink nozzles with tissue paper, etc. Doing so can clog the nozzles. If the head cap and protective tape have been removed and the BJ cartridge is not to be installed immediately, store the cartridge properly to prevent the nozzles from drying out and clogging.

Do not disassemble the BJ cartridge. Also, the BJ cartridge contains electronic circuitry. Do not wash it with water.

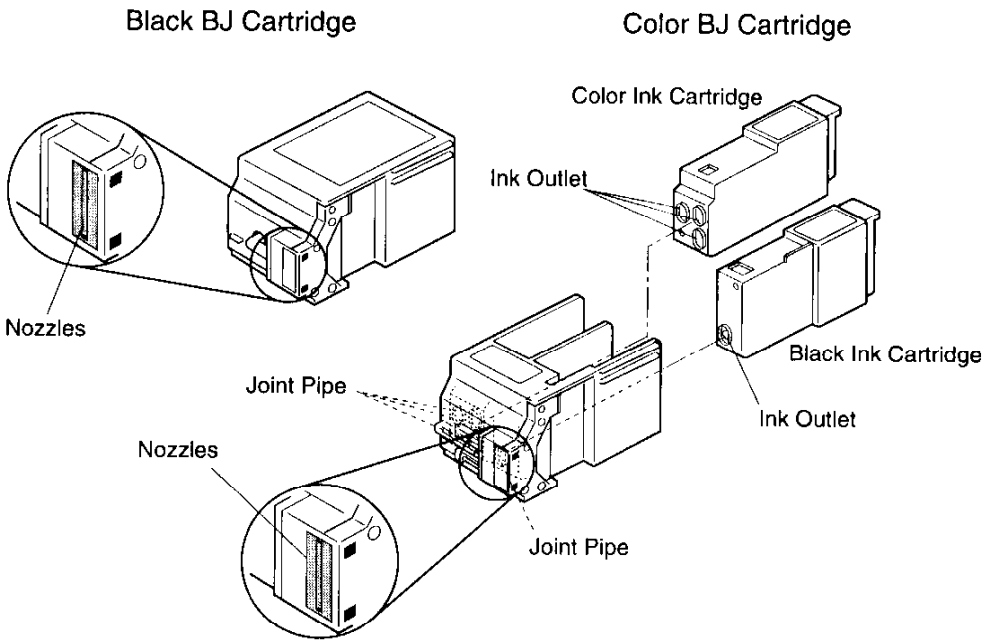


Figure 1-17 Ink Path Cartridge

d) Ink conductivity

The BJ cartridge ink can conduct electricity. If ink has leaked onto any mechanical parts, wipe off with a damp paper towel. If ink has leaked onto the circuit board, use tissue paper and carefully wipe off the ink completely even at the base of the IC chips.

Never turn on the power while ink still remains on the circuit board. Doing so may damage the circuits.

5.2.3 Ink cartridge cautions

a) General cautions

Refer to *a) General cautions on Page 1-29.*

b) Unpacking the Ink cartridge

Do not open the ink cartridge packaging unless you are ready to install the new ink cartridge. Before installing it in the BJ cartridge, remove the protective cap from the ink inlet.

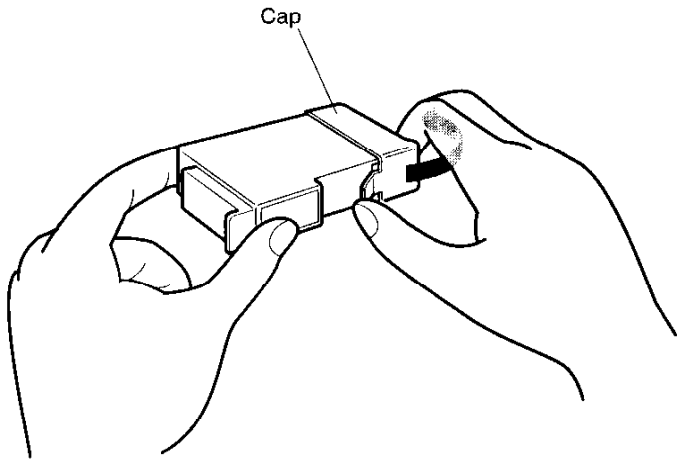


Figure 1-18 Removing Cartridge Cap

c) Preventing ink clogging

Do not touch the ink cartridge's ink outlets. Doing so may introduce foreign matter into the printing head's joint pipes, causing poor ink suction. After removing the cap from the ink cartridge, immediately install the ink cartridge in the printing head to prevent the ink at the nozzles from drying out and clogging. Do not remove the ink cartridge except when it is to be replaced.

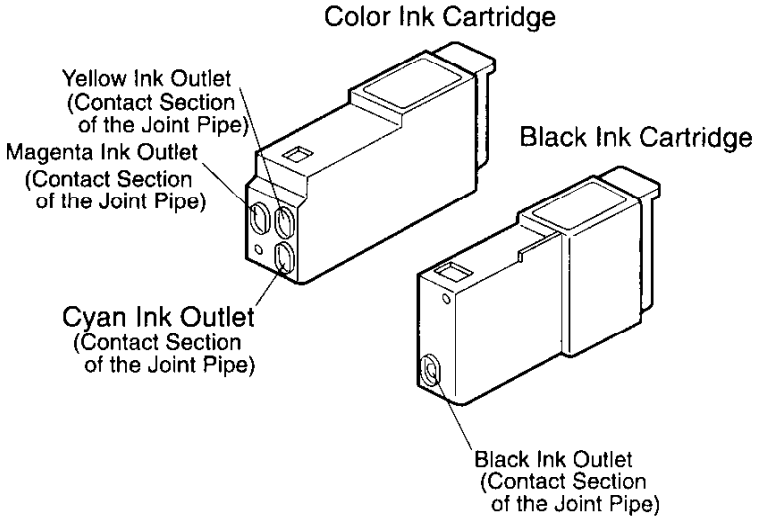


Figure 1-19 Ink Outlet

NOTE

If the ink nozzles are clogged or if the ink suction is poor, the printout may have horizontal white stripes. If the cleaning operation does not restore it to normal, replace the BJ cartridge.

5.3 Servicing Cautions

5.3.1 Damage from static charge

This unit contains contact sensors and printed circuit boards equipped with ROM, RAM, custom chips, etc. These electronic components are susceptible to damage caused by static charge.
When disassembling this unit, take care to prevent static charge.

Static electricity

Static charge can damage electronic components or alter their electrical characteristics. Even plastic tools and hands without grounding wrist straps can generate damaging static charge.

The following items are required to prevent static charge:

- A grounded, conductive mat
- Grounding wrist straps
- A cord with alligator clips to ground this unit's metal chassis

If you do not have any of the above on hand (during on-site servicing), follow the alternate measures below:

- Use a grounding bag to store and transport printed circuit boards and electronic devices.
- Avoid wearing silk or polyester clothing and leather-soled shoes. Wear cotton clothing and rubber-soled shoes instead.
- Avoid servicing this unit in a carpeted room.
- Before servicing this unit, touch this unit's grounded terminals to discharge any static charge.
- Wear grounding wrist straps and ground this unit's metal chassis.
- Always handle the circuit boards and devices along their edges. Do not touch the components and terminals with your fingers.

Shock hazard during power on

If servicing must be performed while this unit is turned on, do not wear any grounding wrist straps. This is to prevent electricity from passing through your body.

5.3.2 Scanner unit

a) General Precautions

- Handle contact sensors with care to prevent scratching or smudging of the scanning surface. Scratches or smudges can cause vertical stripes, etc., to appear on the scanned image.
- Be careful not to scratch the ADF rollers. If the rollers are scratched, paper jams may result.

5.3.3 Print assembly

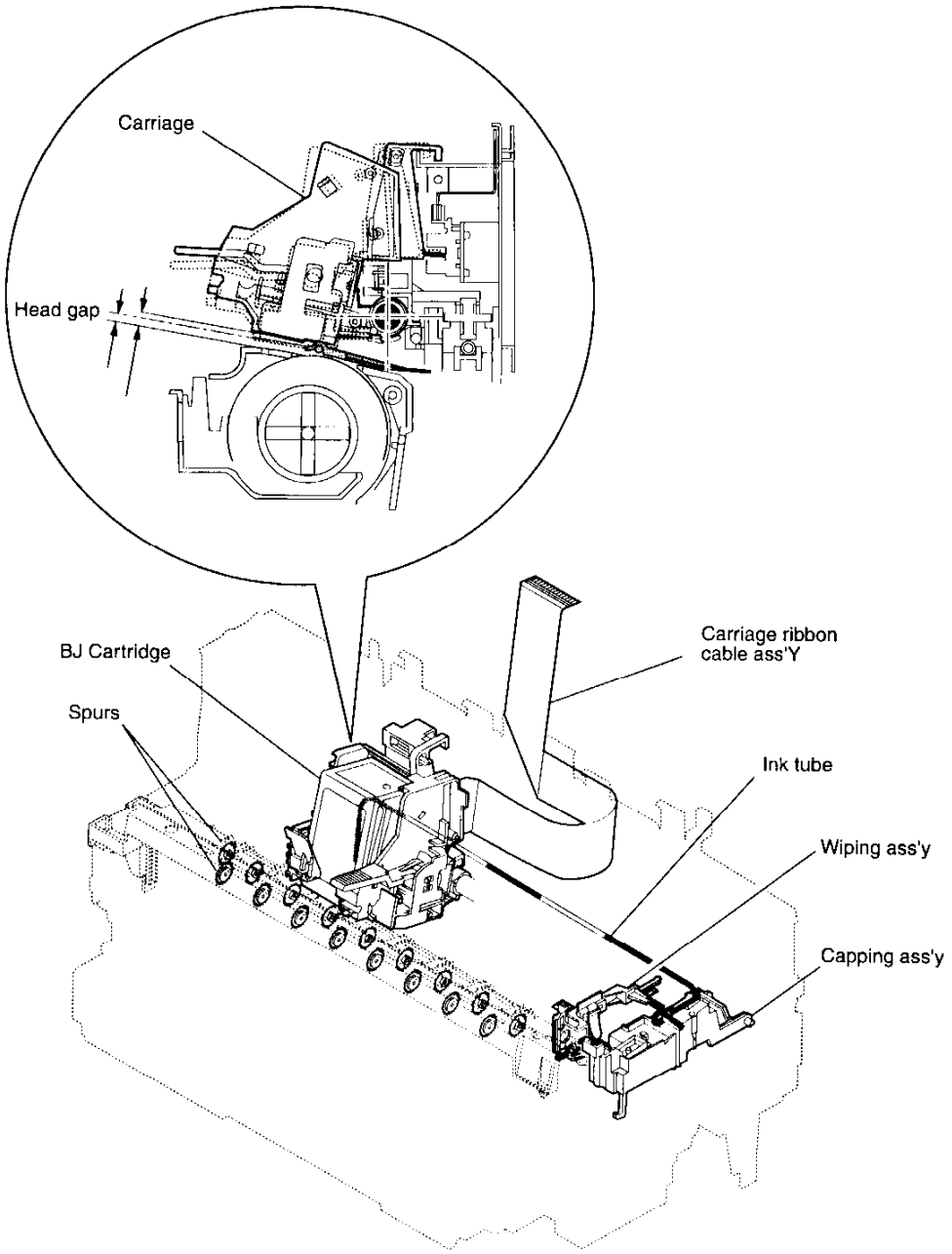
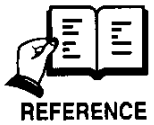


Figure 1-20 Print Assembly Precautions

a) General precautions

Head gap

The head gap is the distance between the BJ head and the platen. It has been factory-adjusted. Replacing or removing the trailer ass'y carriage ass'y, Line feed roller unit, pressure plate, or platen ass'y will change the head gap. This may affect the printing quality.



REFERENCE

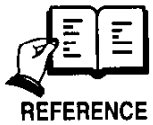
If the printing quality has degraded due to a change in the head gap, see *Chapter 3: 3.3 Head Gap Adjustment on Page 3-10* to adjust the head gap.

Lubrication points

Do not touch the greased parts of the pressure plate, carriage shaft, carriage, trailer, etc. Doing so will wipe off the grease which has been applied for the smooth operation of the printer unit.

NOTE

Do not apply grease to any unspecified parts and surfaces. If grease is on the purge section's rubber cap or the wiping assembly's blade, it may cause the BJ cartridge's nozzles to clog, rendering the BJ cartridge unusable. Also, do not use any grease other than the specified type. Using a different type of grease may dissolve or deform plastic parts.



REFERENCE

If you accidentally touch a greased surface, reapply the grease. See the *PARTS CATALOG* (provided separately).

Spurs

During servicing, be careful not to damage or deform the spur assembly's spur tips. The tips are normally protected by a cover. However, you should still handle the spur with care during printer disassembly. If the spur tips are deformed, the area of the paper coming into contact after the printing increases, causing vertical black stripes on the paper.

Carriage ribbon cable assembly

Do not pull or bend the carriage ribbon cable more than is necessary. Doing so may disrupt the cable's continuity and prevent the printing signals to be sent properly to the cartridge.

Residual ink in the tube pump

Normally, to clean the printing head, the tube pump sucks out ink from the printing head. A vacuum mechanism makes the sucked-out ink go to the waste ink absorbers. However, if the vacuum mechanism is not working properly, ink may remain in the cap or tube. If the printer assembly is then removed for servicing, the ink in the tube may splatter on the printer or work bench. Be careful of any residual ink in the tube.

Power off during printing

During servicing, do not disconnect the power cord during a printing operation or while the cartridge is being replaced. Otherwise, the cartridge will stop at a position where the ink nozzles cannot be protected by the rubber cap. The ink may then dry and clog the nozzles. During servicing, be sure the cartridge is properly positioned for nozzle capping.

5.3.4 Paper feed section

a) General precautions

Setting the paper size

For fax operations, the user sets the paper size with the operation panel. The unit cannot detect the paper size automatically. Therefore, if the paper size is altered during servicing, be sure to set it back to the user's paper size setting.

If the paper size setting does not match the size of the paper installed. One of the following two operations will be executed:

(A) If the paper size setting is the same or smaller than the actual size of the paper installed, the following will be executed:
The document will be printed to fit the length of the paper size that has been set.
Even if the paper size setting is smaller than the actual paper size, printing will be executed and no error will result. Depending on the document, large blank areas may result on the printout.

(B) If the paper size setting is larger than the actual paper size, the following will be executed:
As with (A), the document will be printed to fit the length of the paper size that has been set. Since the actual paper size is shorter than the paper size setting, the document's contents would be broken up to fit the paper size setting. **"CHECK PAPER SIZE"** will therefore be displayed and printing will be canceled.

5.3.5 Control boards

a) Hardware switch and adjustable volume

- The SCNT board's volume resistor VR1 has been factory-adjusted. Service personnel are not to alter its setting.
- The power supply unit's adjustable volume VR1 has been factory-adjusted. Service personnel are not to alter its setting.

REFERENCE

Regarding the jumper plug and switch for servicing, refer to *Chapter 3: 5.1 Hardware Switches on Page 3-32.*

b) Replacing the SCNT board

The SCNT board stores the user data, service data, and other data. Therefore, when replacing the SCNT board, print out the stored data and then enter this data into the new SCNT board.

REFERENCE

The SCNT board replacement precaution is described in *"5.4.4 SCNT board replacement precautions" on Page 1-48.*

5.4 Data-related precautions

The memory IC on the SCNT board stores the user's registration data and values for various counters, etc., required for servicing. Although this data is normally retained in memory, it can be deleted by mistake. When handling this data during servicing, note the following precautions.

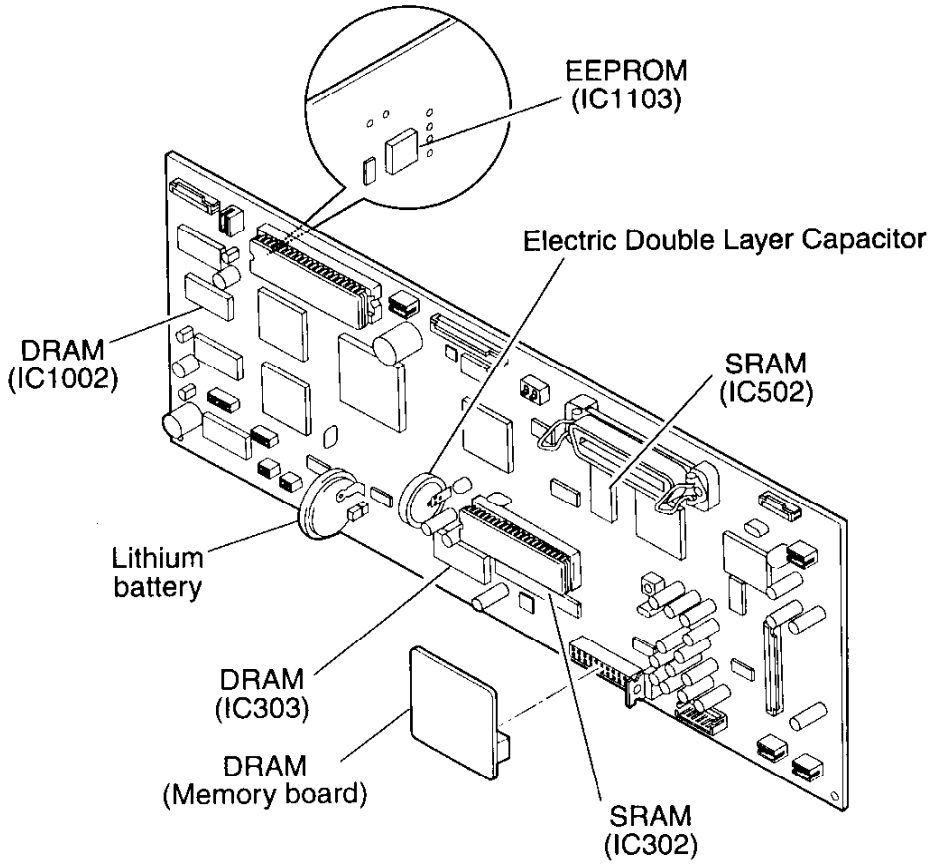


Figure 1-21 Memory IC and Backed up Devices

5.4.1 Data in the image storage memory (DRAM)

DRAM stores image data which was read other than by a direct transmission. It also acts as a buffer memory to store the image data received. With an electric double-layer capacitor as a memory back-up, the stored data is retained for about 1 hour after the power is turned off. When this back-up period elapses, the data is lost. If this happens, the memory clear list is printed automatically the next time the power is turned on. The user is thereby notified of the images that were erased from memory.

NOTE

Electric double-layer capacitor

When the power is turned on, this capacitor starts to recharge. It becomes fully recharged after about 10 minutes. Since a conventional secondary battery is not used, there is no service life limitation based on the number of times it recharges. However, the capacitor can lose its performance if it is fully recharged and then subjected to a high temperature for an extended period.

NOTE

Reception image data transfer

The image data received can be transferred to another fax machine and printed out with the **MEMORY REFERENCE** function. **MEMORY REFERENCE** can be used to transfer the image data received to another fax machine if the image data cannot be printed out due to printer engine trouble.

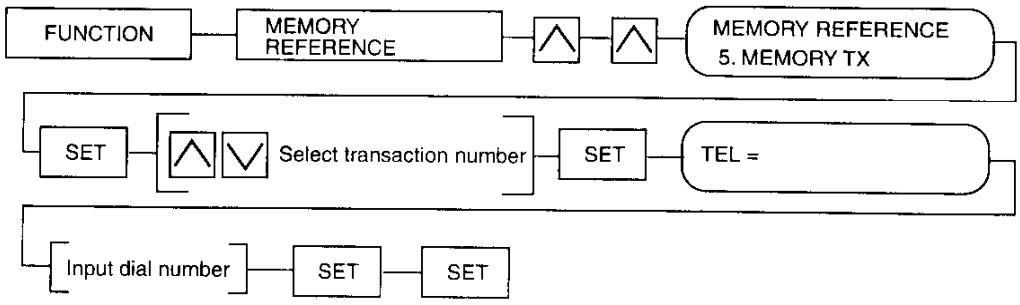


Figure 1-22 Reception Image Data Transfer Method

5.4.2 Data in the control/image processing memory (SRAM)

SRAM is backed up by a lithium battery. It can retain the stored data for 5 years after the power is turned off. SRAM stores the following data: All the data the user entered with the menu system, the activity reports and other report-generating data, the redial data containing the redial destinations set with the Redial key, the servicing data set by repair personnel with the service soft switch, and the factory-entered shading correction data for contact sensor reading correction. SRAM stores almost all of the data which can be entered or set.

These stored data can be checked with various reports.

NOTE

Jumper plug precautions

The control/image processing memory is backed up by shorting the jumper pin (JP13) on the SCNT board with the jumper plug. If the the jumper plug is removed and the power is turned off, the data in SRAM will be lost.

Before removing the jumper plug, be sure to print out the data stored in the SRAM.

NOTE

Lithium battery life

The lithium battery can last for over 5 years after the power is turned off. When the power is on, the lithium battery's power is untapped. Therefore, the actual battery life can be much longer.

When the lithium battery becomes exhausted, **"DELETE FILE PRESS SET KEY"** or **"DATA ERROR PRESS SET KEY"** will be displayed after the power is turned off or on. When this happens, replace the lithium battery. Since the data in SRAM will be lost when the battery is replaced, it cannot be printed out.

After the lithium battery is replaced and the power is turned on, **"DELETE FILE PRESS SET KEY"** or **"DATA ERROR PRESS SET KEY"** will be displayed. Press the **SET** key to discard the contents in SRAM and initialize it to the factory defaults.

These messages indicates that the shading correction data for contact sensor reading correction has been lost. Refer to *Chapter 3: 3.1 Shading Data Adjustment on Page 3-6* to re-enter the shading data.

5.4.3 Data in the EEPROM

The EEPROM stores the printer's emulation settings and the absorption amounts of the three waste ink absorbers and vertical alignment data. The non-volatile EEPROM does not require any electrical power to retain the data it contains.

Calculation of the total waste ink amount of the three waste ink absorbers starts immediately after the printer is used. When the absorption amount of the waste ink absorbers reaches 100 percent, the waste ink full error is generated and the printing operation is stopped to prevent the waste ink from leaking out.

The vertical alignment data is for correcting any vertical misalignment during bi-directional printing.

The data in the EEPROM can be checked or altered.

REFERENCE

Checking or altering the data in EEPROM

Emulation settings:

To check the settings, the user data can be printed out. For details, see the *Chapter 4: 3. USER DATA FLOW on Page 4-5.*

To alter the settings, use the BJ setup utility program. For details, see the *Part 2: Printer on Page 3-8.*

Waste ink absorption amount:

To check the amount, use the service report's System Dump List. For details, see *Chapter 3: a-2) System dump list on Page 3-59.*

To enter the amount, use the service data #7 PRINTER 3. INK ABSORBER CAPA. For details, see *Chapter 3: 5.2.5 New SSSW's/parameters added to this model on Page 3-43.*

Vertical alignment data:

To adjust the vertical alignment, see *Chapter 3: 3.2 Vertical Alignment Correction on Page 3-7.*

Re-entering the waste ink absorber's ink absorption amount.

The amount data is calculated independently for each waste ink absorber. Each amount can be checked or re-entered. The waste ink absorption amount displayed in the **SYSTEM DUMP LIST** indicates the percentage of the respective absorber's maximum capacity that has been reached. The percentage can be indicated and entered in 1% increments. When the waste ink generated immediately after the printer is used reaches 100 percent of the waste ink absorber's capacity, a waste ink full error is generated for each absorber and the printing operation is stopped. Therefore when replacing the SCNT board, be sure to check the current absorption amount and enter it in the new SCNT board.

If the SCNT board assembly malfunctions and the current waste ink absorption amount cannot be checked, replace all of the ink absorbers and set the waste ink absorption amounts to 0%.

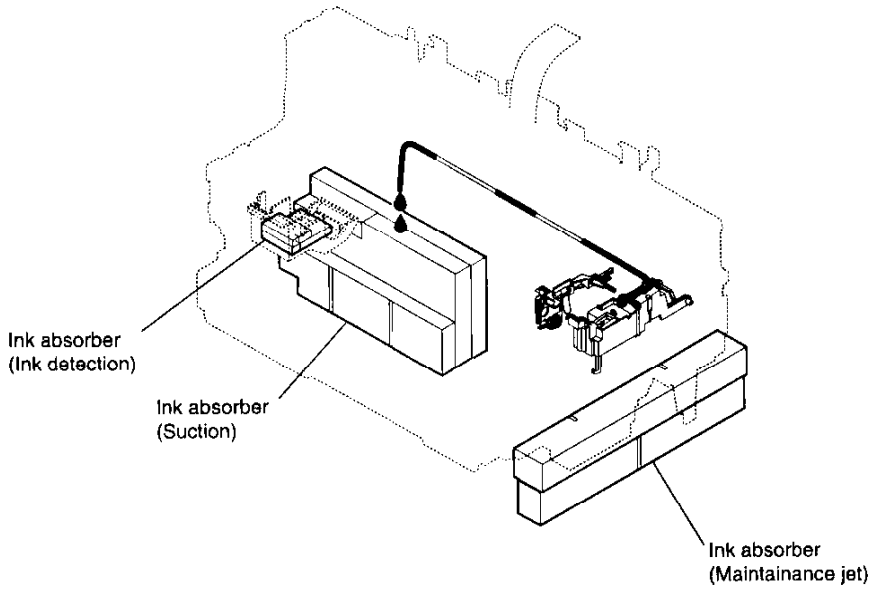


Figure 1-23 Waste Ink Absorber

5.4.4 SCNT board replacement precautions

Before replacing the SCNT board, print out all of the stored data.

The reports which output the data that must be entered into the new SCNT board is listed below.

User report

- **One-touch speed dialing list**
- **Coded speed dialing list**
- **Group dialing list**
- **User data list**
- **Send/Receive Activity report**

Service report

- **System data list**
- **System dump list**

REFERENCE

To printout these reports, see *Chapter 3: 7. SERVICE REPORT on Page 3-59.*

The serviceable SCNT board does not have a jumper plug. This is to prevent the lithium battery power from draining. Use the jumper plug on the old SCNT board.
When replacing the SCNT board, do not forget to remove the memory board from the faulty SCNT board and install a new SCNT board.

After the new SCNT board is installed and the power is turned on, **"DELETE FILE PRESS SET KEY"** or **"DATA ERROR PRESS SET KEY"** will be displayed. Press the **SET** key to discard the SRAM's irregular contents and initialize it to the factory defaults.
Refer to *Chapter 3: 3. ADJUSTMENT on Page 3-6* to enter the shading data and to adjust the vertical line alignment.

Then refer to the report that was printed out beforehand and enter the various data.

5.4.5 Data initialization through service operation

All the data can be initialized with the service data #8 clear operation.

REFERENCE

For details on the initialization procedure and the data that is erased, see *Chapter 3: 5.2 Service Data Setting on Page 3-33.*

NOTE

"All clear" when nothing works.

On a rare occasion, the display may go blank and all the buttons may stop working. Severe electrical noise and static can cause problems as well. In such a case, use the **"All clear"** feature.

After installing the unit for the first time and connecting the power cord, execute **"All clear."** The procedure is described below.

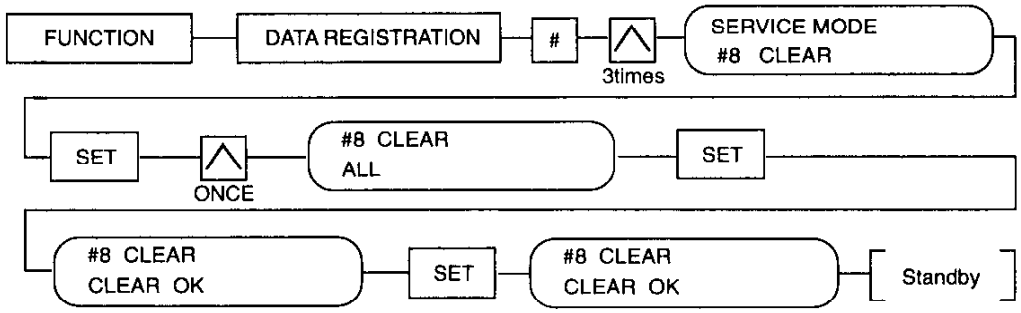


Figure 1-24 All Clear

The All clear operation initializes the user data and service data settings. The shading data are not initialized.

After All clear has been executed, make a copy in the **AUTO HALFTONE** mode and check the image. If the image contains black spots, it is evidence of shading data damage. See *Page 3-6* to re-enter the shading data.

5.5 Protective Mechanism

5.5.1 Received image data transfer function

If a printer malfunction prevents the received image data from being printed, the image data can be transferred to another fax machine for a printout.
However, image data to be transmitted cannot be transferred to another fax machine.

REFERENCE

Reception image data transfer

For details on transferring image data, see *"Reception image data transfer" on Page 1-44.*

5.5.2 Data battery backup function

If there is a power outage or if the power is turned off, the data stored in the control memory and image memory are retained since the lithium battery and electric double-layered capacitor function as a data battery backup.

REFERENCE

For details on the backed up data, see *Chapter 1: 5.4 Data related precautions on Page 1-43.*

5.5.3 BJ cartridge maintenance features

a) Cleaning

To maintain high printing quality, the fax unit has a cleaning feature that wipes off dust from the BJ cartridge nozzles with a head wiper and fills the nozzles with fresh ink.

b) Nozzle capping

The fax unit caps the BJ cartridge nozzles with the Capping section cap after the carriage returns to the front of the Capping section on the right side. This protects the nozzles from dust and prevents the ink from drying out or leaking.

c) Maintenance jet

The fax unit has a maintenance jet feature which purges ink from all the ink cartridge nozzles to the purge unit. This prevents the nozzles from clogging and ensures high printing quality.

5.5.6 Lightning protection

The fax unit's electrical components are protected from abnormal voltage caused by lightning.

Protected Component	Safety Device
SCNT board assembly	Arrestors (ZD2) on the primary side of the SCNT board NCU discharges a voltage over 320 to 480 VDC via the power cord

NOTE

When protection is not possible

The SCNT board may not be adequately protected even with the protection circuits if lightning strikes the telephone line.

5.5.7 Power leakage protection

The AC line, telephone line, and metal parts of the fax unit are completely insulated. The fax unit has a grounded power cord (three-prong plug) to prevent electrical shock. If power leakage does occur, use the fax unit only with a grounded electrical outlet supplying the proper voltage.

6. QUALIFICATION REQUIRED FOR INSTALLATION WORK

The qualifications for installation must satisfy local laws and regulations.

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1. COMPONENT LAYOUT

The mechanism is composed of the Document Feed Section, which separates pages from a stack of documents and feeds them in one at a time to the Scanning section; the Paper Supply Section, which supplies separated paper or special paper to the Printer Section, and ejects them to the paper tray after printing; and the Printer Section, which performs cleaning of the BJ head, and printing to paper.

For details on each Section of the mechanism, see the sections below, beginning with *2. SCANNER MECHANISM on Page 2-3.*

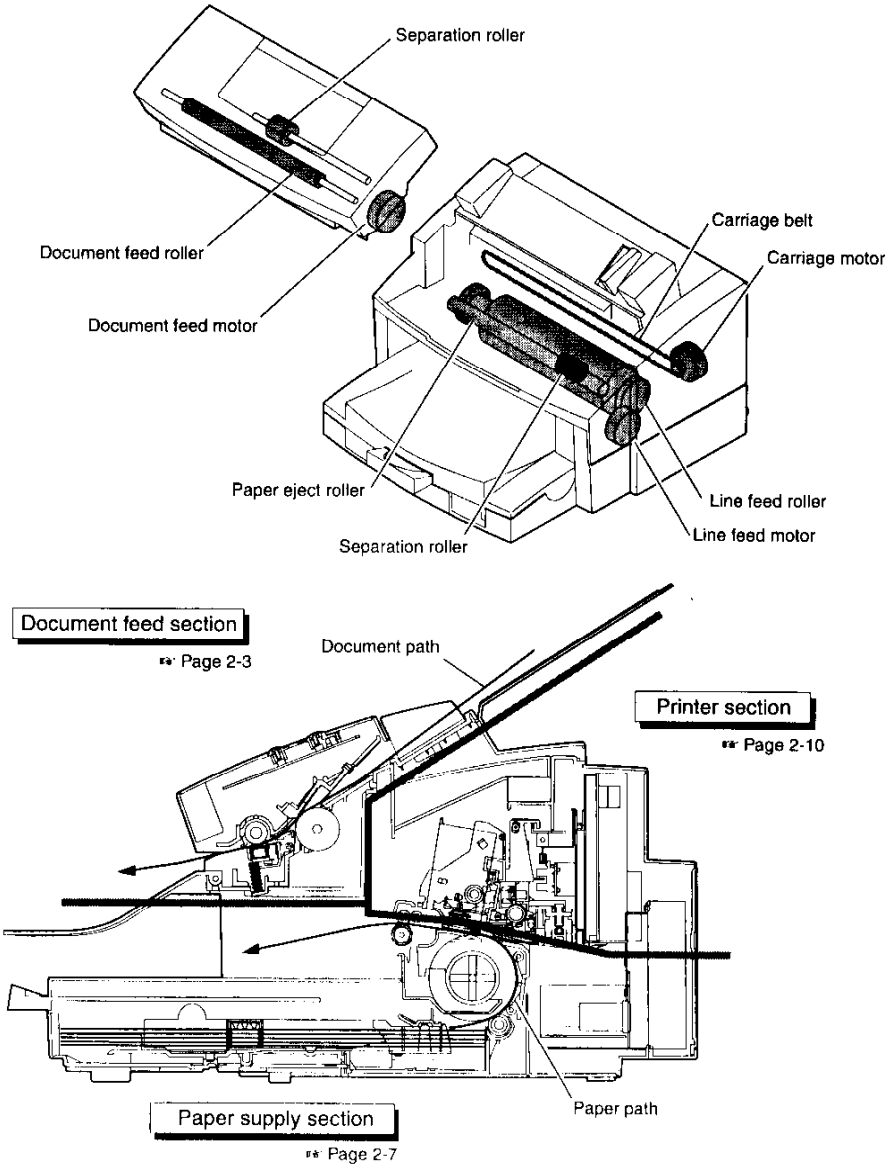
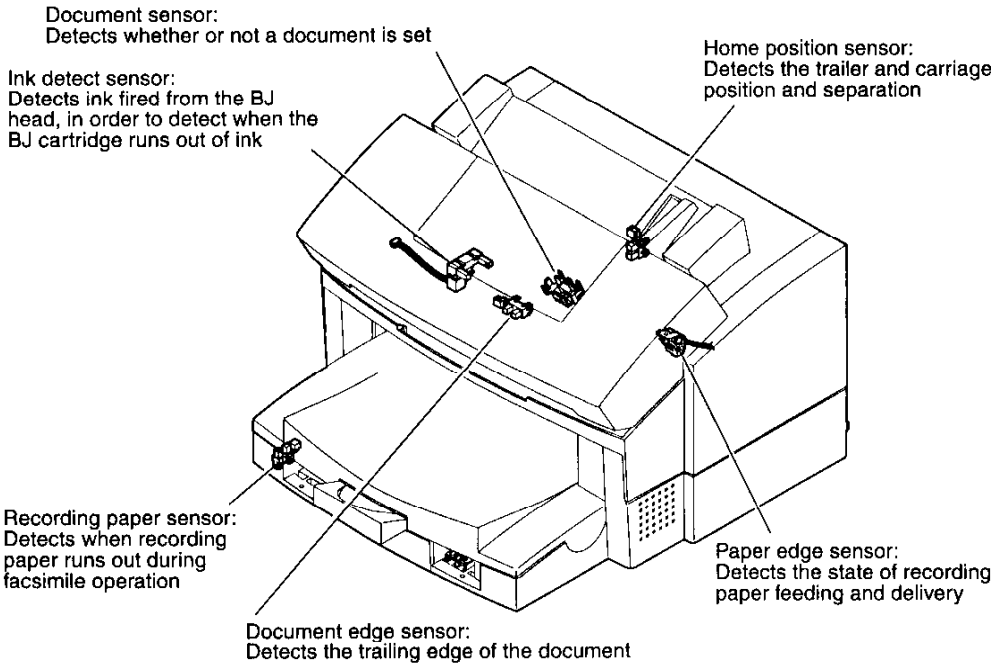


Figure 2-1 Mechanical Layout

The electrical section is composed of the following: the SCNT board, which performs system control; the NCU board, which is the interface with the telephone circuit; the modular board, which relays between the modular connector and the NCU board; the power supply unit; and the OPCNT board, which detects key operations and displays status information. There are also six sensors to detect system status.


Document sensor:
Detects whether or not a document is set
Ink detect sensor:
Detects ink fired from the BJ head, in order to detect when the BJ cartridge runs out of ink
Home position sensor:
Detects the trailer and carriage position and separation
Recording paper sensor:
Detects when recording paper runs out during facsimile operation
Paper edge sensor:
Detects the state of recording paper feeding and delivery
Document edge sensor:
Detects the trailing edge of the document

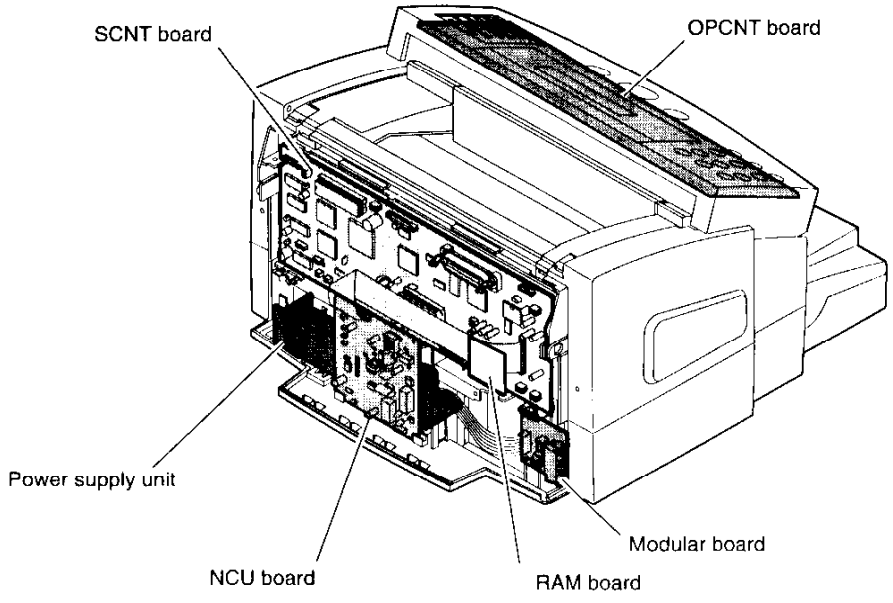


Figure 2-2 Electrical System Layout

2. SCANNER MECHANISM

The structure of this model's Document Feed Section is based to a large extent on that of the FAXPHONE B540/B550, MultiPASS 800.

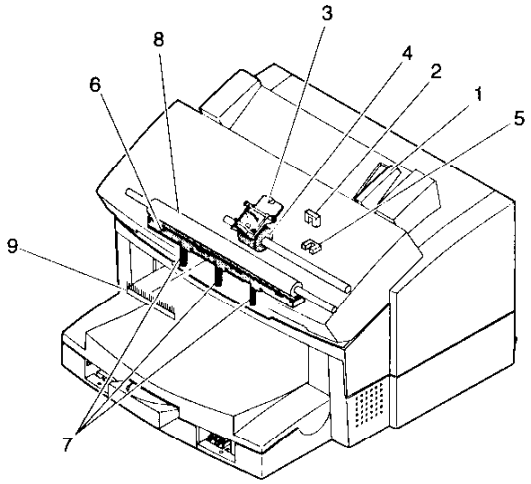


Figure 2-3 Document Feed Section

Names and Functions of Parts

1. Paper Guide

When properly adjusted to the width of the documents, the guide will hold the documents in the horizontal direction to prevent them from skewing when fed.

2. Document Sensor (DS)

This sensor uses an actuator to detect the presence of documents to be scan, and sends that information to the SCNT board by way of the gate array on the OPCNT board.

3. Separation Guide

Separates the documents to prevent doublefeeding.

4. Separation Roller

Takes documents which were separated at point A, and delivers them, one sheet at a time, to the Contact Sensor.

5. Document Edge Sensor (DES)

Using an actuator, the DES detects the edge of a document just before the Contact Sensor, and sends this information on to the SCNT board.

6. Contact Sensor **→ See Page 2-5.**

Scans the image information from the document, converts it to serial data, and transmits it to the SCNT board as an electrical signal.

7. Springs

Force the Contact Sensor upwards to press the document closely between the Contact Sensor and Document Feed Roller.

8. Document Feed Roller

Delivers and ejects the documents, keeping it pressed closely against the glass surface of the Contact Sensor so that it can be scanned clearly.

9. Static Eliminator brush

Removes static electricity which may have built up on the document in the scanning process, and guards against roller jams.

NOTE

Fundamentals of document separation

The separation of documents is accomplished by the difference in friction coefficients at point ① in *Figure 2-4*. The relationship between the friction coefficients is given by the equation.

(friction coefficient between the original and the separation roller) > *(friction* coefficient between the original and the friction pad) > (friction coefficient between the originals)

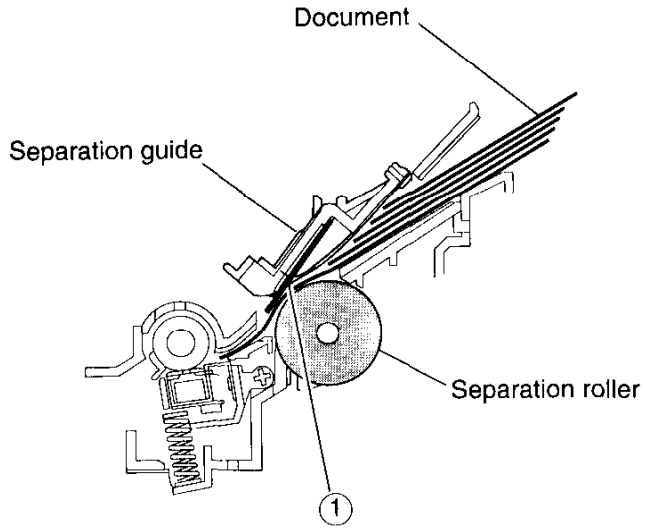


Figure 2-4 Document Separation

NOTE

Document Jam Detection

There are two types of document jams which may occur.

a) Feed Jam

Occurs when the leading edge of the original is not detected by the Document Edge Sensor within 15 seconds after the start of document separation.

b) Eject Jam/document too long

Occurs when the document is fed for one meter or more after the detection of the document's leading edge, without detecting the document's trailing edge.

When one of these types of jams occurs, all data which have been read and stored in memory (which are not part of a page that has already been completely transmitted or copied) are erased.

NOTE

Contact Sensor

The Contact Sensor used in the Document Feed Section scans Letter-width 8.43" (214 mm), documents at a horizontal resolution of 8 dots/mm (203.2 dpi).

Resolution in the vertical direction may be selected by the *FINE/STANDARD* button on the operation panel. Resolution is 3.85 lines/mm (97.8 lpi) in Standard mode and 7.7 lines/mm (195.6 lpi) in Fine mode (for fax transmission).

For copying, the read resolution is automatically set to following.

Auto halftone :	360 dpi × 360 dpi
Binary :	8 line/mm × 360 dpi

The structure of the Contact Sensor is shown in *Figure 2-5*. Light from the two LED cells, located at either end of the Contact Sensor, is directed by the optical guide, gathered by the lens, and used to illuminate the surface of the document. Light reflected back from the document surface is captured by 1728 amorphous silicon photosensor chips. The captured light is amplified as an analog signal, and sent as serial data to the image processing IC on the SCNT board.

The image processing IC (UHQ-VI) on the SCNT board performs image processing (Auto-halftone) in order to cleanly transmit documents containing a mix of text and images.

REFERENCE

For details on Auto-halftone, see *8. NEW FUNCTION on Page 2-32.*

NOTE

Shading Correction

To compensate for variations in Contact Sensor output, this model has shading correction data stored in its control SRAM and image processing SRAM, when shipped from the factory. Thus, it does not perform a prescan of each page, as performed by previous models. Conformity of the shading data is maintained by comparing the data between the two previously mentioned SRAM blocks before reading each page. If for some reason, there is an error in the shading data, the message **"DATA ERROR PRESS SET KEY"** will be displayed to indicate the shading data error. In this case, the shading correction data constant from the image processing IC SRAM is used.

When using the constant from the image processing IC SRAM, there is a possibility of black spots appearing when in Auto Halftone Mode. When this type of image defect occurs, try re-registering the shading data.

REFERENCE

For details on the shading data re-registration process, please see *Page 3-6.*

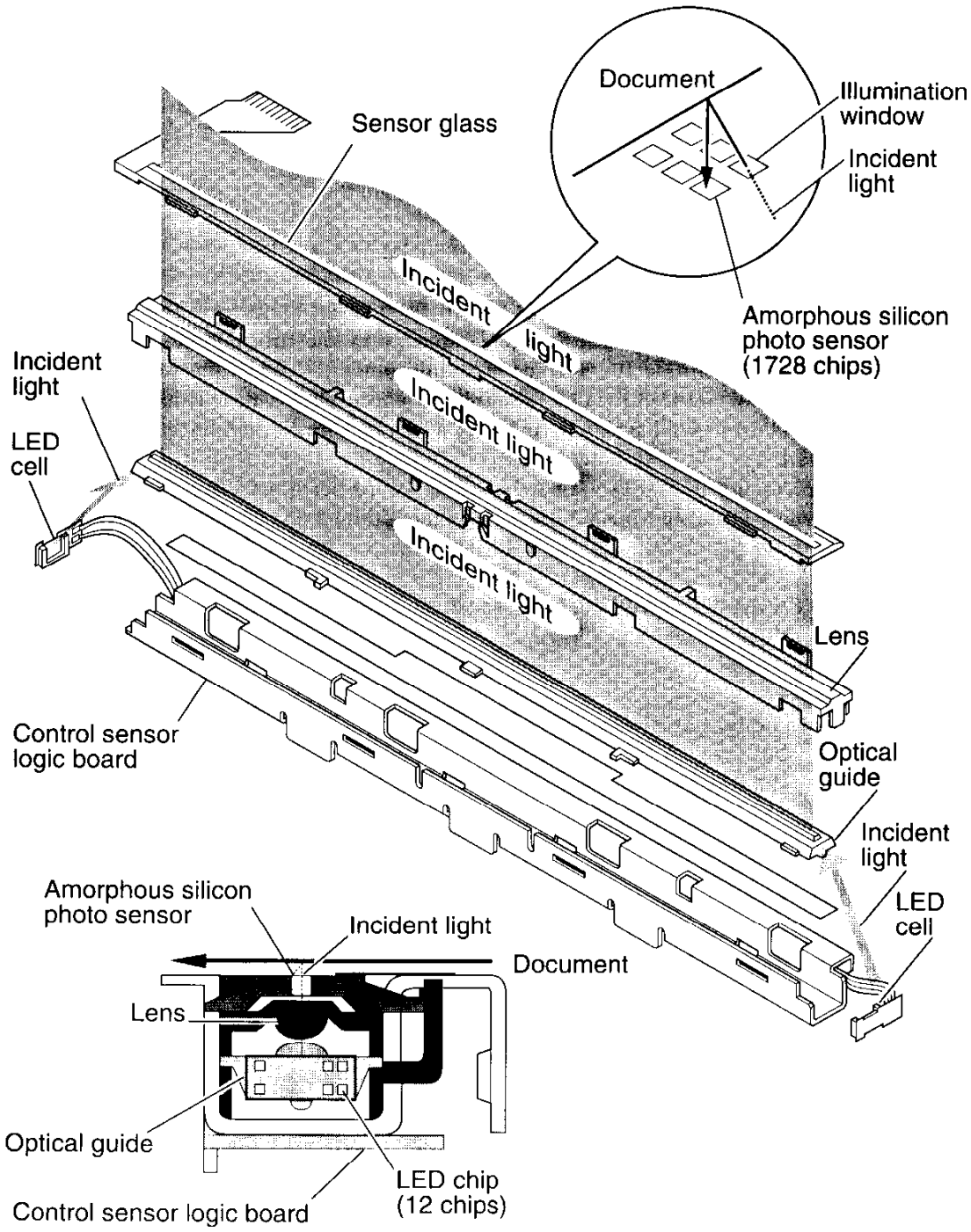


Figure 2-5 Contact Sensor

3. PAPER SUPPLY MECHANISM

The paper feed mechanism in this model contains a newly-designed horizontal delevery ASF (Automatic Sheet Feeder).

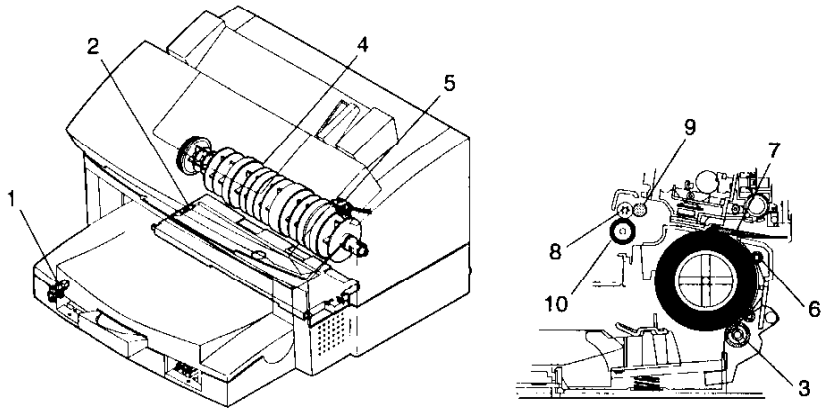


Figure 2-6 Paper Supply Section

Names and functions of parts:

1. Recording paper Sensor (RPS)
Detects the presence or absence of paper for fax reception.

2. Lifting Plate
This plate moves upwards by the force of the springs and the release cam mechanism, lifting the paper stack until it touches the Line Feed Roller. After separation, it moves back down to its original position.

3. Separation Roller
The Separation Roller works together with the Line Feed Roller to separate just one sheet from the paper (which has been lifted up by the Lifting Plate) and holds the rest of the paper in place.

4. Line Feed Roller
The Line Feed Roller transports paper, which has been picked up by the separation roller, to the printing position in the Printer Section. It then feeds the paper one line at a time, in coordination with the carriage movement.

5. Paper Edge Sensor (PES)
This sensor monitors the paper feed state, and detects jams and misfeeds.

6. Pinch Roller Unit
Holds the paper against the Line Feed Roller after separation, and transports it to the Pressure Plate.

7. Pressure Plate → See Page 2-10.

8. Spur
This spur is used to transport the printed paper properly, without damaging its printed surface. It is shaped so as to make it difficult for ink to stick to it.

9. Cleaner Roller
A roller which cleans the spur when dirtied with ink.

10. Paper Eject Roller
A roller used to eject the paper.

NOTE

Paper Separation Mechanism

Paper feed begins when the trailer presses down the Lifting Plate control arm while the Line Feed Roller is rotating. The Lifting control arm presses down the Transmission gear. The movement causes the Lifting Plate control cam to rotate, and the Lifting Plate raises the paper. The paper, which has been raised by the Lifting Plate, is carried by the Line Feed Roller to the Separation Roller. At this time the Separation Roller, together with the Lifting Plate movement, moves upwards and touches the Line Feed Roller. However, since the Line Feed Roller's turning force is greater than the back tension torque of the Separation Roller, the Separation Roller will turn with the Line Feed Roller.

When the paper reaches this point, all paper other than the one sheet which touches the Line Feed Roller will be obstructed by the Separation Roller's back tension (which is supplied by its spring clutch), thus preventing multifeeds. The mechanism is designed so that the force relationships are as given in the following formula:

(feeding force between paper and Line Feed Roller) > (back tension of paper and Separation Roller) > (friction between sheets of paper)

After separation, the paper is held between the Line Feed Roller and the Separation Roller, and transported to the Printer Section. Since the Line Feed Roller's turning force is greater than the back tension torque of the Separation Roller, the Separation Roller will turn with the Line Feed Roller.

Afterwards, when the control cam turns and the Lifting Plate moves downwards, the Separation Roller will move down as well, and stop being turned by the Lift Feed Roller.

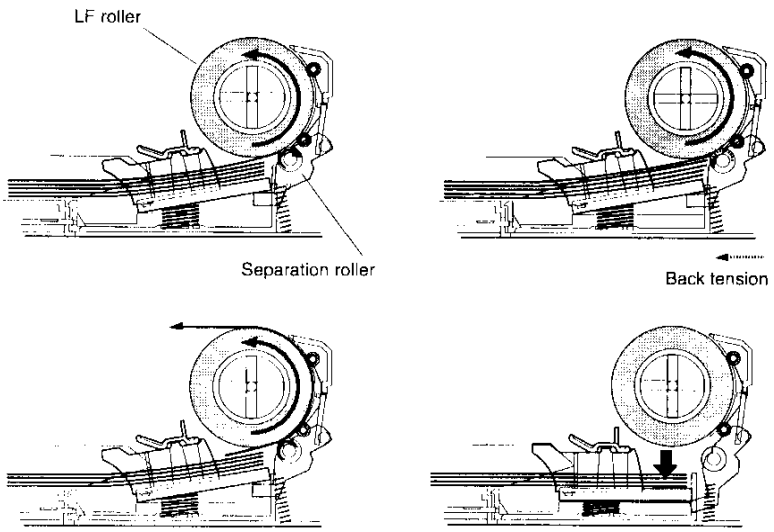


Figure 2-7 Paper Separation Mechanism

NOTE

Paper jam detection

There are three types of paper jams which may occur:

a) Feed delay jam

Occurs when the Paper Edge Sensor does not detect the paper's leading edge within 4 seconds after the start of the feed operation, with the ink nozzles uncapped (or within 9 seconds with the ink nozzles capped).

b) Eject delay jam 1

Occurs when the Paper Edge Sensor does not detect the paper's trailing edge after the page has been printed or within 7 seconds of paper feed operation.

c) Eject delay jam 2

Occurs when the paper's trailing edge is detected and the Paper Edge Sensor remains ON, even after the paper feed operation is executed for 1 second.

When a paper jam occurs, memory reception begins from the page at which the paper jam occurred.

When copying, the data are erased from memory as soon as an error occurs.

4. PRINTER SECTION

The printer section uses a new print engine, designed especially for this model.

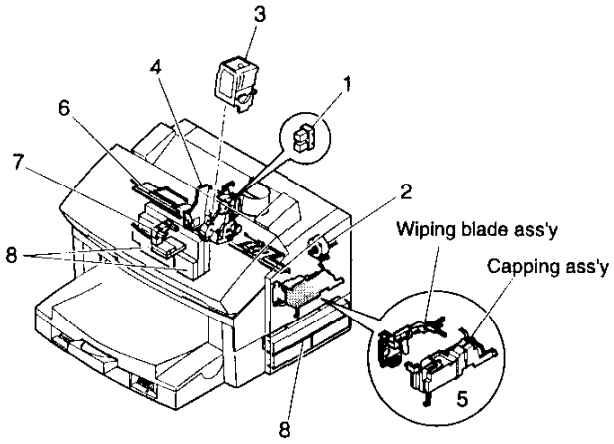


Figure 2-8 Printer Section

Names and functions of parts

1. HPS (Home Position Sensor)

This sensor detects the home position, for drive and control of the trailer. Detection of carriage and trailer separation is also performed by this sensor.

2. Carriage Drive Motor

This is a stepping/pulse type motor, which is controlled with pulse width modulation. It moves the trailer by belt drive.

3. BJ Cartridge **→ See Page 2-18.**

4. Trailer and Carriage **→ See Page 2-11.**

When printing, the trailer and carriage, which contains the BJ cartridge, are coupled together. They move back and forth horizontally across the paper and do the printing. During cartridge cleaning, the carriage remains at the right side while the cap tube is squeezed by the trailer's pressure roller, sucking ink from the cap area to refresh the ink in the BJ head nozzles.

5. BJ cartridge cleaning and protection section **→ See Page 2-13.**

In order to maintain the BJ cartridge's high print quality, the BJ cartridge's nozzles and spray orifices are cleaned by a wiper and pump. When in standby mode, the BJ cartridge's spray orifice section is covered by a rubber cap to prevent the nozzles from drying out and ink from leaking.

6. Pressure Plate

The pressure plate works to prevent paper from waving or lifting while being printed, and to maintain a fixed distance between the paper and the head by adjusting the head gap for the thickness of the paper passing under it. It holds the paper down by means of three torsion springs, while the paper transport supports the paper with a needle roller.

7. Ink Detection Sensor **→ See Page 2-16.**

Ink is ejected directly over the optical axis of a pass-type photosensor, which detects the change in light intensity to determine whether or not ink is being ejected.

8. Waste ink absorbers

Absorb waste ink from cleaning or ink empty detection.

NOTE

Print Shift Correction

Print gaps can occur when doing bidirectional printing, due to changes in the weight of the BJ cartridge and mechanical errors. This gap is corrected by adjusting the carriage drive motor load and the carriage position, which is determined logically from the number of stepping pulses. Gap detection is performed before the start of printing, during the home position detection operation.

NOTE

Trailer and Carriage separation

This model uses separation of the trailer and carriage to switch between printing and cleaning functions. Separation is performed mechanically by means of clamps on the trailer and on the right side of the printer frame, which alternately grasp the shaft on the rear of the carriage.

1. Standby

The carriage is fixed by the clamp (A) on the print engine frame. Since the clamp (B) on the trailer is not grasping anything, it can enter inside clamp (A), as seen in illustration (A).

2. Start of printing

When printing starts, the trailer must carry the carriage. The trailer will be moved by the CR motor to the right side of the printer. Both arms of clamp (B) will slip inside the arms of clamp (A) and catch the carrier's shaft. To determine whether the trailer is carrying the carriage, the trailer is moved past the Home Position Sensor. If the sensor is tripped once, it is determined that only the trailer passed by. If it is tripped twice, it is determined that the carriage is being properly carried by the trailer. If the carriage has not been properly coupled with the trailer, the **"CHECK PRINTER"** error message will be displayed and printing will stop. If the STOP key is then pressed, the trailer will move the carriage back to its standby position and then stop.

3. End of printing

When printing completes, the trailer will move to the right side. The reverse of the start of printing action will then occur. Both arms of the frame-mounted clamp (A) will slide inside the arms of the trailer clamp (B), and clamp (A) will catch the carriage's shaft. The trailer and carriage will be separated, and the BJ head will be protected by the cap. The trailer will then move past the Home Position Sensor to verify that the trailer and carriage have been properly separated.

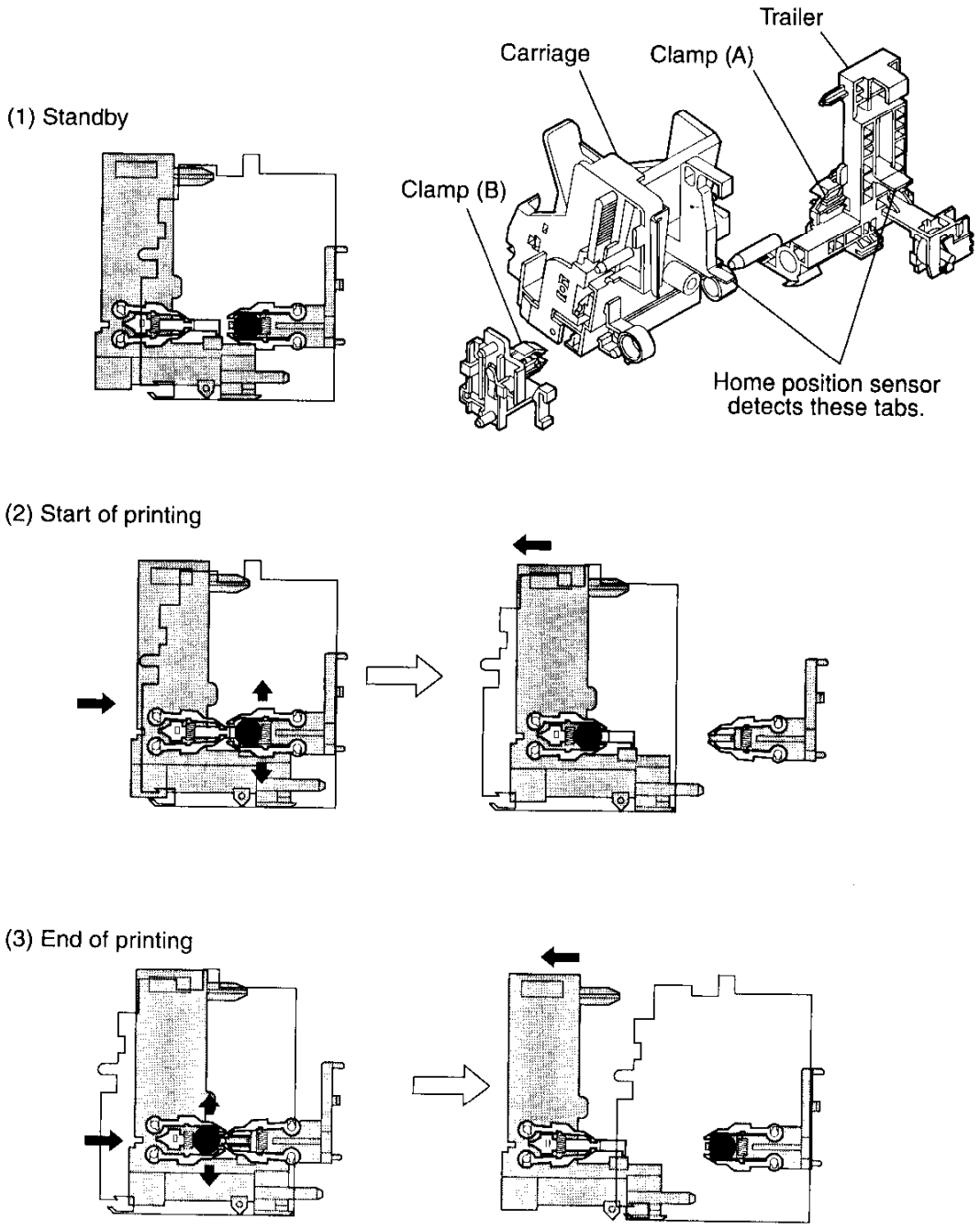


Figure 2-9 Trailer and Carriage Separation

NOTE

BJ head protection

In order to always maintain good print quality, this model performs cleaning of the BJ head at appropriate times.

There are three types of cleaning operations: tube suction, wiping, and maintenance jet. Also, the print head is capped after printing, to preserve the head.

- **Cleaning operation (tube suction)**

A tube for ink suction protrudes from the cap, parallel with the guide shaft. The suction operation is performed by squeezing this tube. Details of this operation are given below.

(1) Capping

In the capping operation, the carriage, which contains the BJ cartridge, is moved to the right side of the printer, and the ink spray orifice section of the BJ cartridge is covered with a rubber cap. The trailer then separates from the carriage and moves to the centrally located Home Position Sensor to confirm the separation.

Confirmation of the separation occurs as the Home Position Sensor detects the passing by of light interruption tabs on the trailer and carriage.

(2) Suction operation

The suction operation is performed by the trailer as it separates from the carriage.

At the rear of the trailer is a roller for squeezing the tube. The roller axle is built so that it can move up and down, guided by a groove in the frame. The roller is also held in place by a spring, so that the height of the roller is maintained when not being guided by the frame groove.

The normal path of the roller is shown in *Figure 2-10*, illustration (A).

To squeeze the tube during cleaning, the trailer is moved from left to right, to the position shown in illustration (B), and then is stopped as the roller position is lowered. By then moving the trailer from right to left, as shown in illustration (C), the roller moves along the lower guides. In this way, the tube is squeezed by the roller, applying suction to the cap.

After performing a suction operation on the head once, it is necessary to send the waste ink remaining in the tube to the waste ink absorber. To do this, the trailer is again coupled with the carriage, and the suction operation is performed several times.

The cleaning operation is performed at the following times:

- When the user initiates a cleaning operation
- At power-on
- When the BJ cartridge is changed
- At the start of a print operation when at least 72 hours has passed since the last cleaning

(However, when using the BC-21, the first cleaning after changing the BJ cartridge/ink cartridge will occur when a print operation begins after 24 hours or more.)

• Wiping operation

When the carriage passes by from left to right, the wiper blade drops down so that it does not touch the print head. When the carriage passes by from right to left, the blade rises to contact the print head and wipe away paper fibers and ink residue.

The wiping operation is performed at the following times:

- At the start of printing when less than 72 hours has passed since the last cleaning operation
- Every 60 seconds during printing (or after a fixed number of dots have been ejected)
- During a capping operation

• Maintenance jet

The maintenance jet operation prepares the nozzle spray orifice ink surface shape by performing an ink test, firing at the maintenance jet absorber.

The maintenance jet operation is performed during a cleaning operation, after a wiping operation, and after a fixed time (BC-20: 12 seconds; BC-21: variable, between 5 and 20 seconds) while printing.

• Capping after print completion

The capping operation is performed at the following times:

- When a fixed amount of time (BC-20: 12 seconds; BC-21: variable, between 5 and 20 seconds) passes after the completion of printing without new print data being received by the Printer Section
- During printing, after the second wiping operation (i.e. after 120 seconds) with no print data received by the Printer Section
- After changing the BJ cartridge

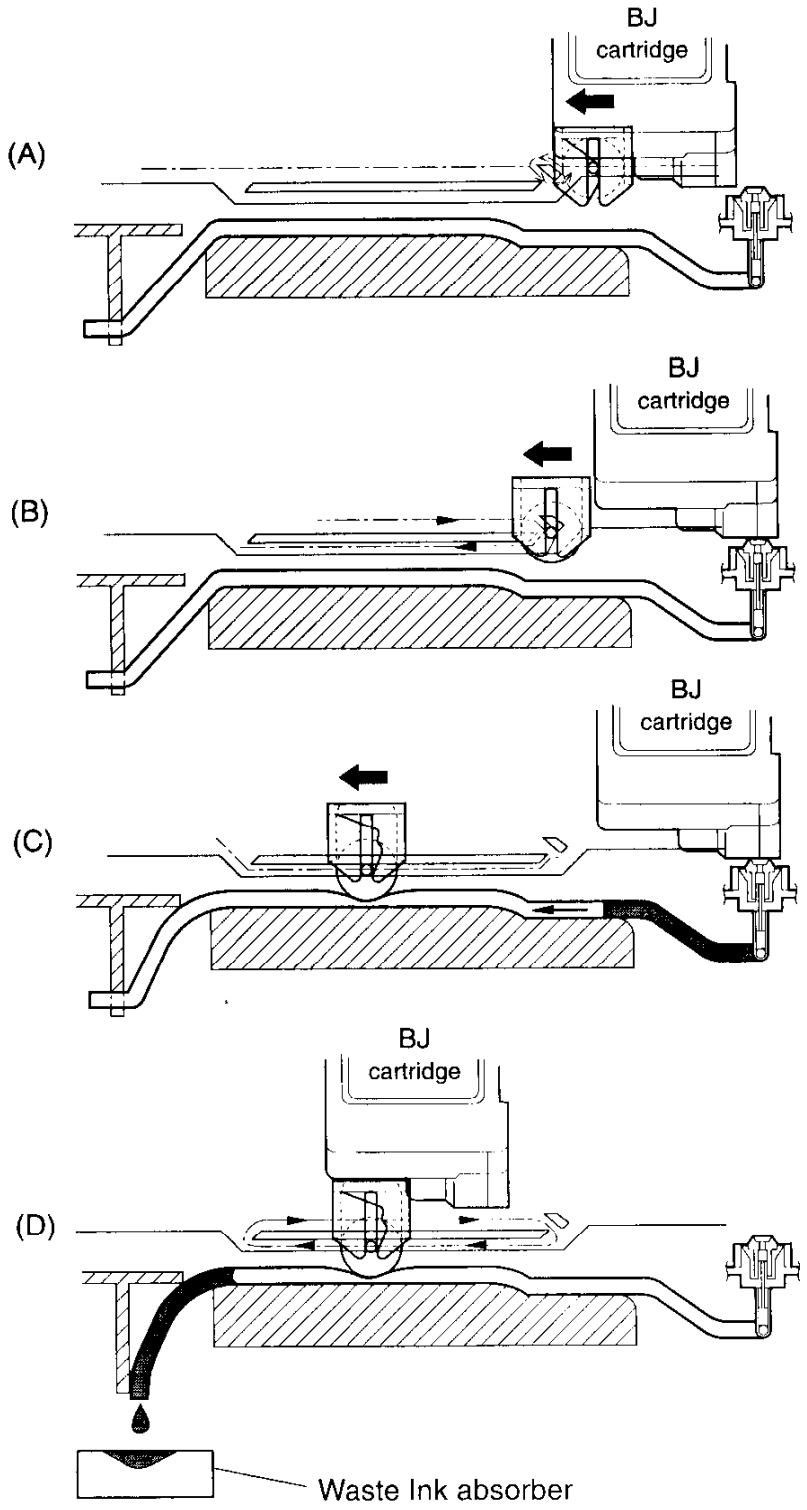


Figure 2-10 BJ Cartridge Cleaning and Protection Section

NOTE

Automatic head gap adjustment

This model is capable of automatically adjusting the head gap for the thickness of the paper.

In previous models, in order to print on envelopes and other thick paper, the head-media gap was changed by moving a lever. This model, however, automatically adjusts the head gap for the thickness of paper, so no manual adjustment is necessary.

When paper passes below the pressure plate, the pressure plate is moved upwards by the thickness of the paper. Since the carriage rides on top of the pressure plate, it moves up and down with the pressure plate, maintaining a fixed head gap.

If parts are replaced, the head gap must be adjusted. If the head gap is not set at the proper value, ill effects such as slanted vertical lines can result.

For information adjusting the head gap, see *Page 3-10.*

NOTE

Ink empty detection

Ink empty detection during fax operation is performed by firing black ink between the light source and receptor of the ink sensor, located on the left side of the printer.

When ink passes between the source and the receptor, as shown in Figure 2-11, the sensor output will be a pulse waveform. The presence of ink may be determined from the pulse generation time.

Ink empty detection is performed at the end of each received page of printing. If it is determined that there is ink remaining, the image data for that page will be erased from memory. If the cartridge is out of ink, the message **"REPLACE CARTRIDGE"** will be displayed to inform the user that the cartridge is out of ink, and the page will be "received" to memory again from the image data.

The detection level of the ink detection sensor is adjusted automatically by means of a feedback circuit, and thus requires no manual adjustment. If the sensor output does not reach a standard level, even after performing feedback control (such as if the receptor is completely blocked, or if a sensor defect occurs), the ink sensor failure will be reported with the display of the **"CHECK PRINTER"** (error code ##348) message.

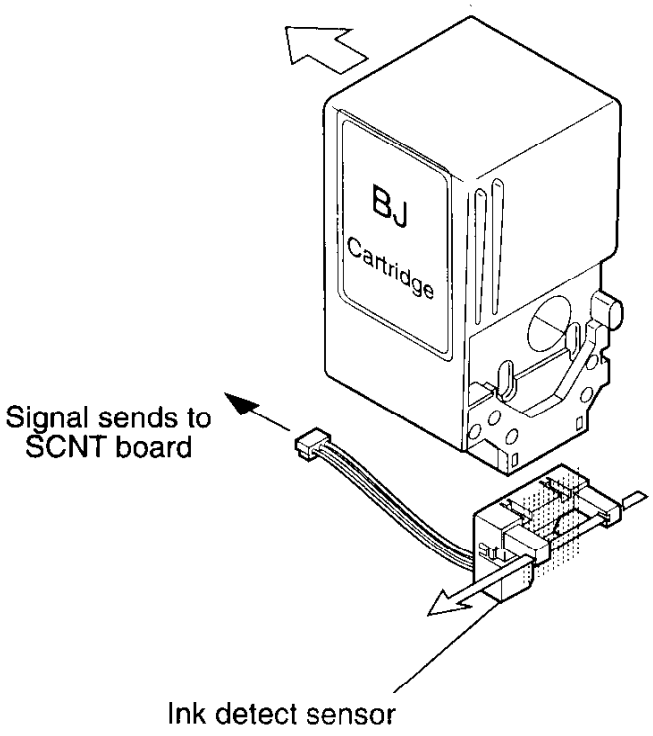


Figure 2-11 Ink Empty Detection

NOTE

Waste Ink Absorbers

This model has three ink absorbers: the suction waste ink absorber, the maintenance jet waste ink absorber, and the ink detection waste ink absorber.

- Suction waste ink absorber
  Absorbs ink sucked from the cap
- Maintenance jet waste ink absorber
  Absorbs ink from the test firing used to adjust the nozzle condition
- Ink detection waste ink absorber
  Absorbs ink fired to detect the presence of remaining ink during fax receipt

The amount of ink absorbed by each of these pads is counted independently. When any of the counted absorption levels reach 100%, the **"CHECK PRINTER"** message (error code ##341, ##342, or ##343) will be displayed, and printing will stop to allow the absorbers to be changed. To clear the error, it is necessary to replace the absorbers and to reset the waste ink absorption level counts. For the method of resetting the waste ink absorption level counts, see *Page 1-46.*

5. BJ CARTRIDGE

This model accepts two types of BJ cartridges, the BC-20 and BC-21.

5.1 Structure

a) BC-20 Black BJ cartridge structure

The black BJ cartridge contains a 360 dpi × 128 nozzle bubble jet print head unit, on-demand thermal ink jet type, containing 44 ml of ink. The black ink contained in the ink sponge is filterd with a meshed ink filter to remove dust, and sucked into buble jet priint head unit through a joint pipe.

b) BC-21 Color BJ cartridge structure

The color BJ cartridge has a printing head equipped with 360 dpi × 136 nozzles through which the four ink colors are ejected (24 nozzles each for yellow, magenta, and cyan; 64 nozzles for black). The ink cartridge (one for black and one for the other three colors) are removable and replaceable. The BCI-20 black ink tank contains 9 ml of black ink. The BCI-21 color ink tank contains 5 ml each of yellow, cyan, and magenta ink.

REFERENCE

For details on the structure of the Bubble jet head unit structure (Printing mechanism), INKSAVER (economy) printing, and maintenance jet, see the *FACSIMILE BASIC•INTER SUPPLEMENT 2 (supplied separately).*

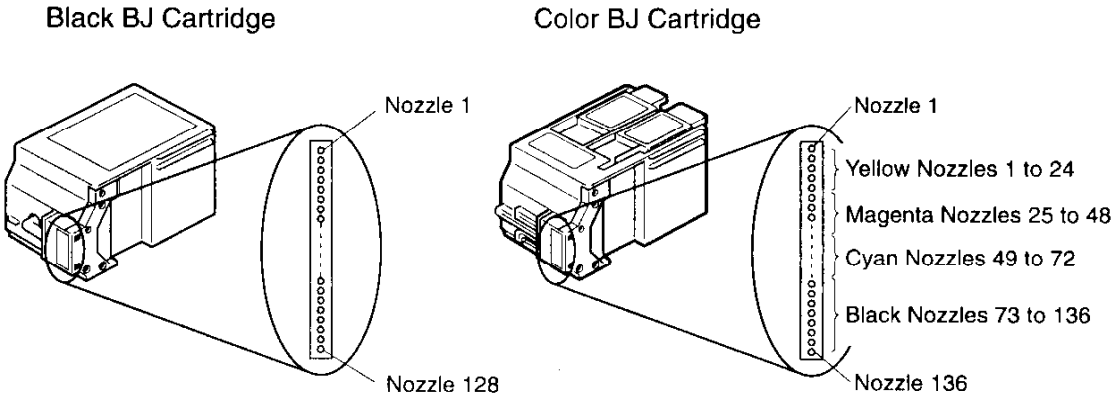


Figure 2-12 Nozzle Arrangement

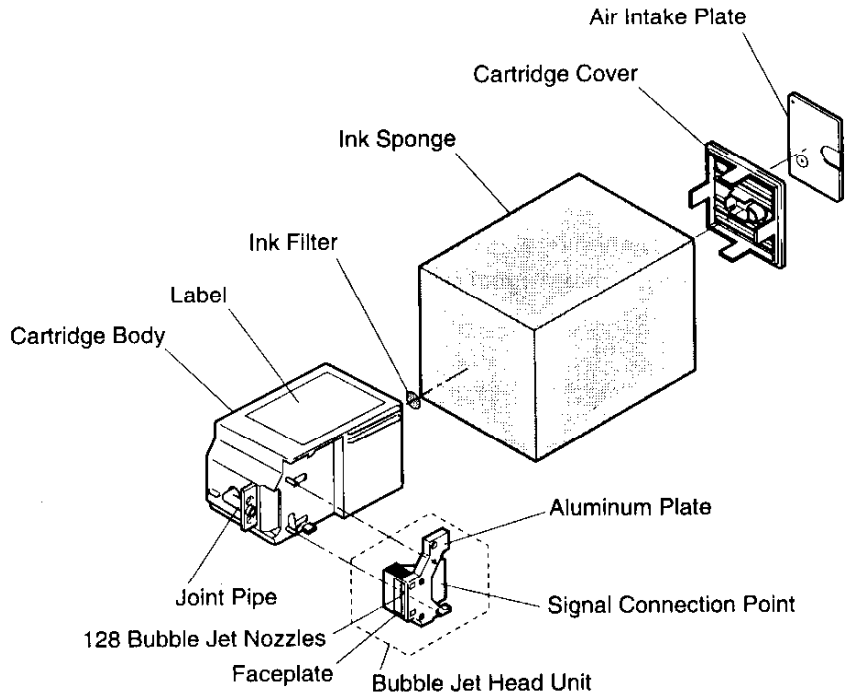


Figure 2-13 Black BJ Cartridge Structure

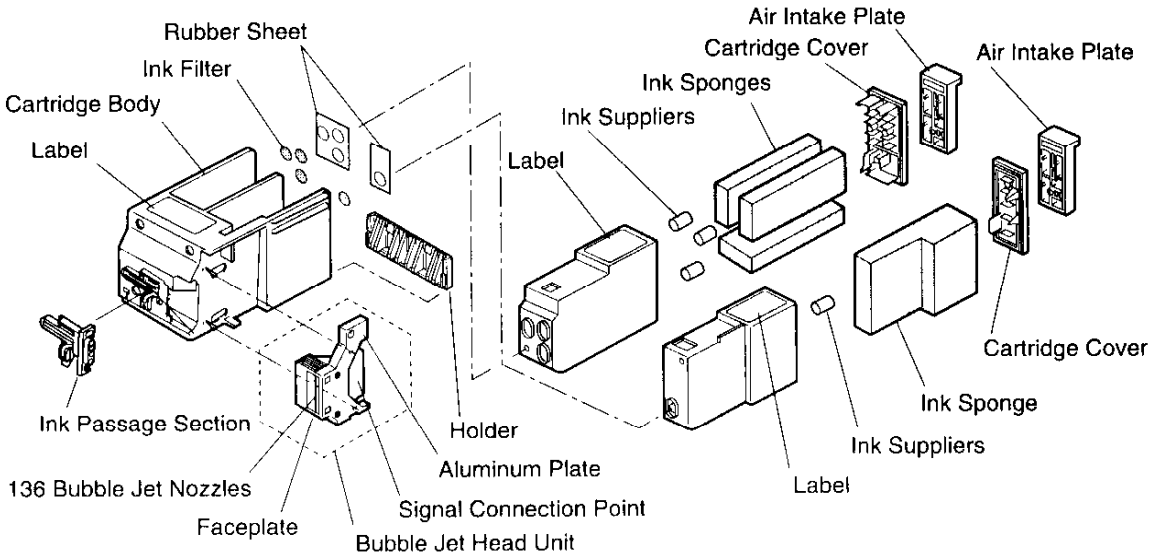


Figure 2-14 Color BJ Cartridge Structure

5.2 BJ Head Driver Block Diagram

- **128/136 bit shift resistor**
  Stores the printing data (HDATA) transferred from the control board at HCLOCK's timing.

- **128/136 bit latch**
  Latches the printing data (HDATA) converted by the 128/136 bit shift resistor.

- **Block enable decoder**
  After the BENB (Block enable) 0, 1, and 2 code signals are input, the specified heat timing signal is output. The heat timing signal is divided into eighths.

- **Heater (1 to 128 and 1 to 136)**
  The heater generates the bubbles required for the nozzles to eject the ink. The heater heats the bubble jet nozzles. Heating is executed with the timing signal produced by the block enable decoder and the even nozzle heat enable (EvenENB), odd nozzle heat enable (OddENB), and heat enable (HENB0 to 3) signals.

- **Sub heater**
  This heater maintains the optimum conditions in the nozzle for ejecting ink.

- **Temperature control heater**
  This heater controls the head temperature to stabilize the ink ejecting amount.

- **Rank resistor**
  To execute optimum heat control of each BJ cartridge, production-related deviation in heater characteristics is classified into 13 types which are identified by changing the rank resistance. From the printer MPU's analog port, the printer MPU detects the different rank resistance as voltage values and converts them from analog to digital for detection. The heater's characteristics are thereby recognized.

- **Head temperature sensor**
  Temperature changes in the nozzle's heater are detected by the diode to prevent the bubble jet head from overheating.

- **Cartridge ID**
  With the ID0 and ID1 combinations, the BJ cartridge type (color or black) is recognized.

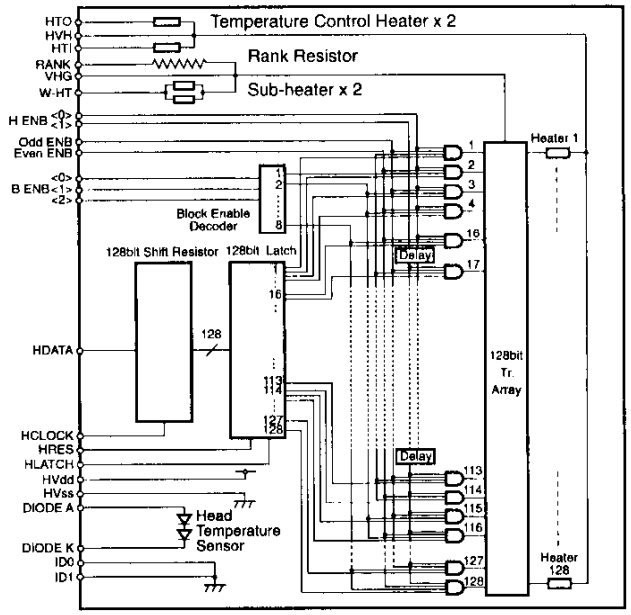


Figure 2-15 BJ Head Driver Block Diagram (Black BJ Cartridge)

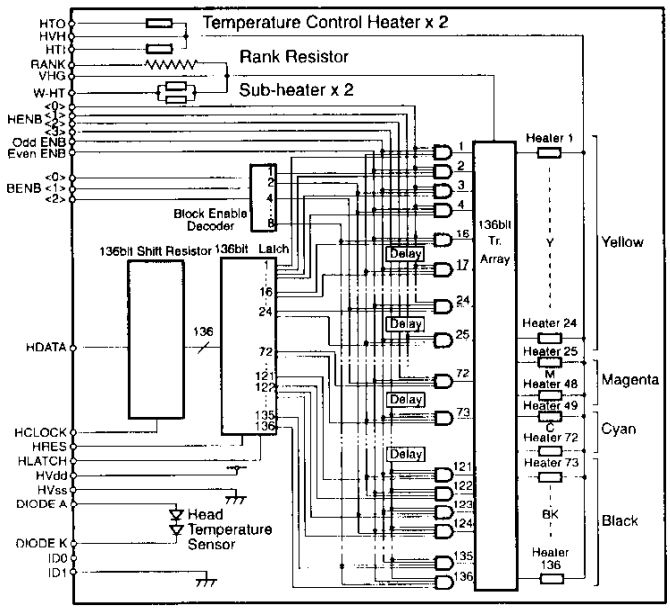


Figure 2-16 BJ Head Driver Block Diagram (Color BJ Cartridge)

5.3 Printing Signal

a) Black BJ cartridge drive control

The black BJ cartridge driving control is executed by dividing the head's 128 nozzles into 8 blocks (16 nozzles each). These blocks are further divided into odd and even blocks (8 nozzles each). The odd blocks eject ink simultaneously, and the even blocks do so as well. The control signals for the former are the block enable 1, 2, and 3 signals (BENB 1, 2, 3), and for the latter the signals are the even/odd enable signals (Even/odd ENB).

The heat enable 0 and 1 (HENB 0, 1), which are the heater drive control signals for ejecting the ink, comprise the pre-pulse and main pulse. To constantly achieve optimum ink ejecting, the internal conditions such as the head's rank, printer temperature, head temperature are monitored, and the heater drive pulse width is varied before the pulse is output. Also, the printing drive signal from the printer controller is transferred to the BJ head's shift resistor according to the HLATCH timing.

The printing drive signal (HDATA) is latched and when the printing control signal and heater drive control signal are output together, the heater for the applicable nozzles is driven, and the ink is ejected.

b) Color BJ cartridge drive control

The color BJ cartridge head's nozzle configuration differs from that of the black BJ cartridge. (The black has 64 nozzles while the color has 24 nozzles each for Y, M, and C.) Therefore, the number of nozzles in each control block is different from that of the black BJ cartridge. Also, since the heaters are driven simultaneously for each color, the heater drive control signals used are the heat enable (HENB) 0, 1, 2, and 3 signals. Otherwise, everything else is the same as with the black BJ cartridge.

For heat enable, the HENB 0, 1, and 2 signals drive the nozzle heaters for Y, M, and C. The HENB 3 signal drives the nozzle heater for black ink.

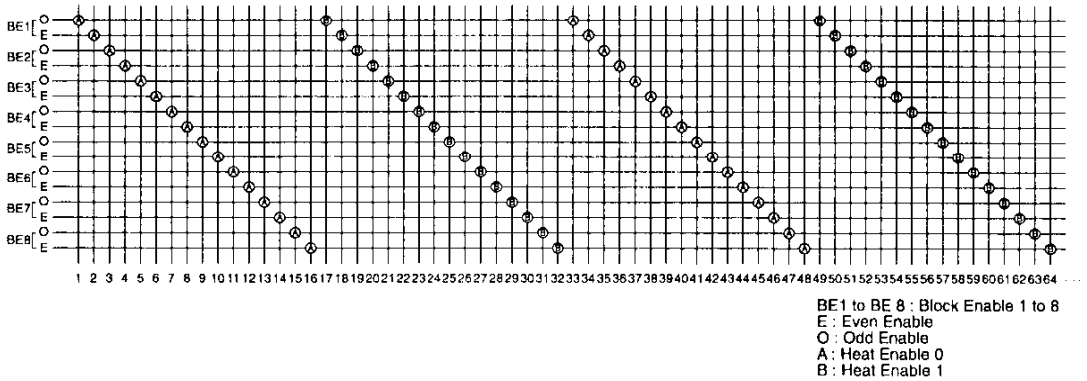


Figure 2-17 Printing Sequence (Black BJ Cartridge/HQ Mode)

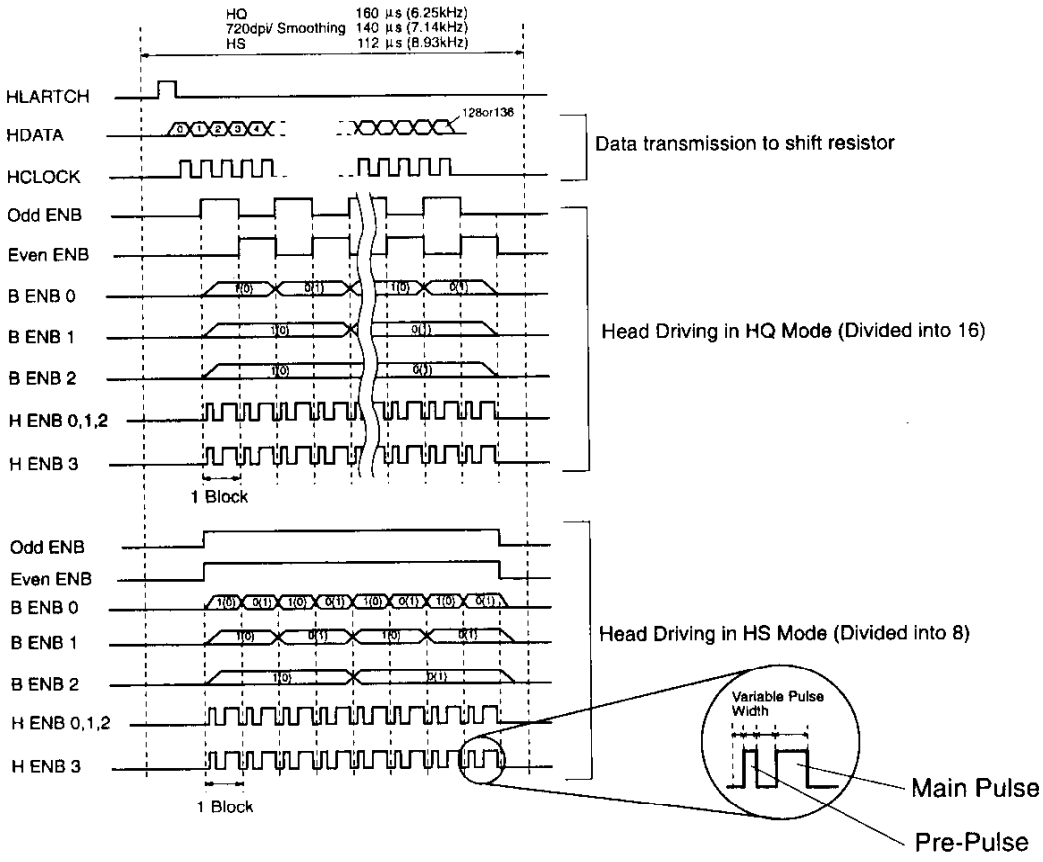


Figure 2-18 Printing Signals (HQ Mode)

6. ELECTRIC CIRCUIT

6.1 Component Block Diagram

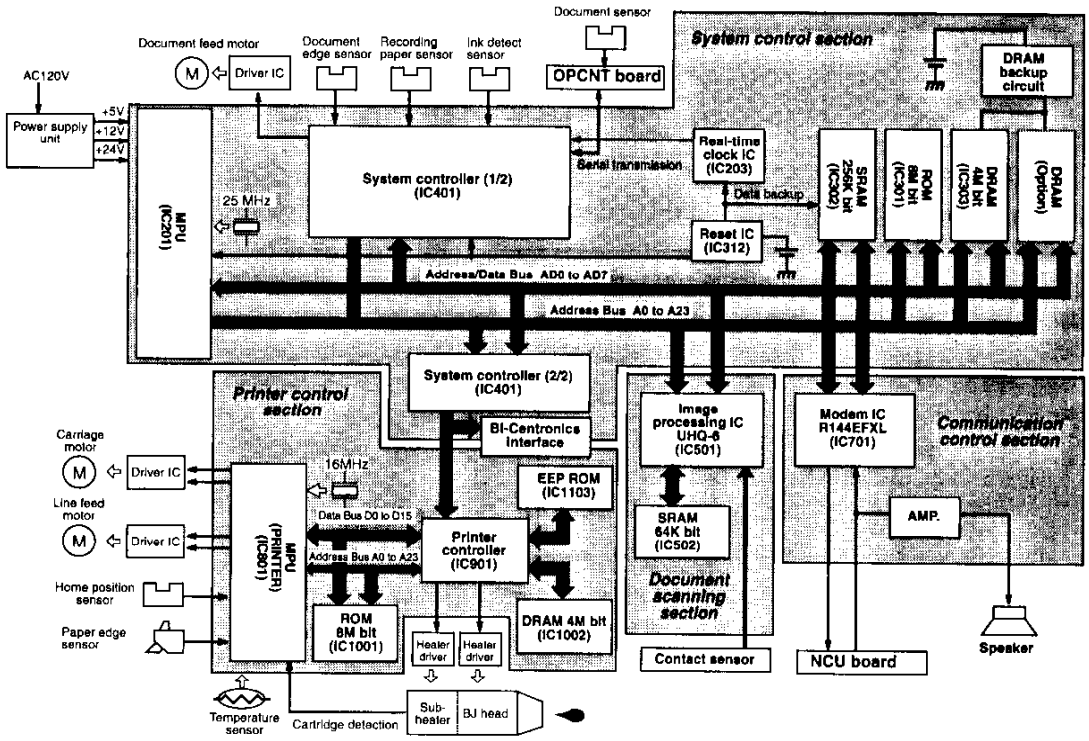


Figure 2-19 Block Diagram

6.2 SCNT Board Components

a) System control section

The system controller is made up of the following components, and controls the entire fax system.

a-1) MPU (Micro Processor Unit) (IC 201)

The main functions of the NEC μPD70433GJ-12-3EB MPU are as follows.

- 16 bit CPU
- 24 bit address bus
- 8 bit data bus
- DMA control
- A/D converter
- Serial interface
- Software CODEC
- Interrupt control unit

a-2) System controller (IC 401)

The system controller is a gate array for controlling MPU peripheral devices. The main functions of the system controller are as follows:

- Printer resolution conversion (Ultra-smoothing)
  This IC converts facsimile data of horizontal resolution of 8 dots/mm and vertical resolution of 3.85 or 7.7 lines/mm to print data of 360 dpi and 360 dpi, respectively.
- BJ printer interface
  8 bit parallel print data sent to the Printer controller.
- OPCNT serial interface (Contains document sensor signal)
- DRAM/SRAM controller
  Controls DRAM/SRAM read/write and renewal.
- Document feed motor control
- Serial-to-parallel conversion
  Serial data from the image processing IC are converted to parallel data and DMA-transferred.
- Horizontal scaling
- Detection of document edge sensor and recording paper sensor
- Detection of ink detection sensor
- Detection of model selection switch status

a-3) RTC (Real Time Clock) IC (IC 203)

RTC4553A is used as the RTC. The RTC IC is backed up by lithium battery, and counts the date and time.

a-4) Main ROM (IC301)

This 8 Mbit ROM contains the control programs (e.g. operation panel, scanner and communications section etc.) for this fax.

a-5) SRAM (IC 302)

This 256 Kbit SRAM is backed up by lithium battery. SRAM holds data registered for system control and communications management information.

a-6) DRAM (IC 303)

This 4 Mbit DRAM is backed up by an electrical double layer capacitor (approx. 1 hour after AC power interruption), and is used as memory for storing image data, and as an MPU work area.

b) Communication control section

b-1) Modem IC (IC 701)

A Rockwell R144EFXL PQFP is used as the modem IC. The MODEM IC carries out G3 modulation conforming to ITU-T standards V.27ter, V.29, V.17 and V.33 on transmitted data received from the MPU during transmission. During reception, the MODEM IC carries out G3 modulation on received signals from the telephone line, according to the same standards.

c) Document scanning section

c-1) Image processing IC (IC 501)

The main functions of the image processing IC (UHQ-6) are as follows:

- A/D conversion
  Input signals from the contact sensor are A/D converted.
- Generation of shading data
- ABC (Auto Background Control)
  Sets the slice level for each scan line.
- Edge enhancement processing
- Binarization processing
- Autohalftone processing

c-2) SRAM (IC 502)

This 64 Kbit SRAM is used as a buffer for the image processing data and shading correction data.

The SRAM is backed up by lithium battery, and stores shading correction data.

d) Printer control section

d-1) Printer controller (IC 901)

The main functions of the printer controller are as follows:

- Bi-centronics interface
- EEP-ROM control
- Print head control

d-2) MPU (IC 801)

- 16 bit CPU
- 24 bit address bus
- 16 bit data bus
- Carriage motor / Line feed motor control

  The stepping motor controller outputs the carriage motor's single- and two-phase exciter drive signal, and paper feed motor's two-phase drive signal.

  The stepping motor controller switches the carriage motor with the 5-step peak current value for optimum driving. The stepping motor controller outputs the switching control signal to the carriage motor driver.
- Detection of BJ head temperature
- Detection of Home position sensor and Paper edge sensor.
- Cartridge detection.

d-3) ROM (IC 1001)

The 8 Mbit control/CG ROM contains the program and bitmap font data for printer control.

d-4) DRAM (IC 1002)

4 Mbit DRAM is used as the receive buffer, download buffer, print buffer, and working area.

d-5) EEPROM (IC 1103)

Controlled by the printer controller, the 1 Kbit EEPROM (Electrically Erasable and Programmable ROM) stores various printer emulation settings, and the waste ink amount discharged to the three waste ink absorbers.

6.3 Flow of Image Signals

a) G3 transmission

(1) With the LED as a light source, the image is scanned by the contact sensor, and analogue image data sent to the SCNT board.

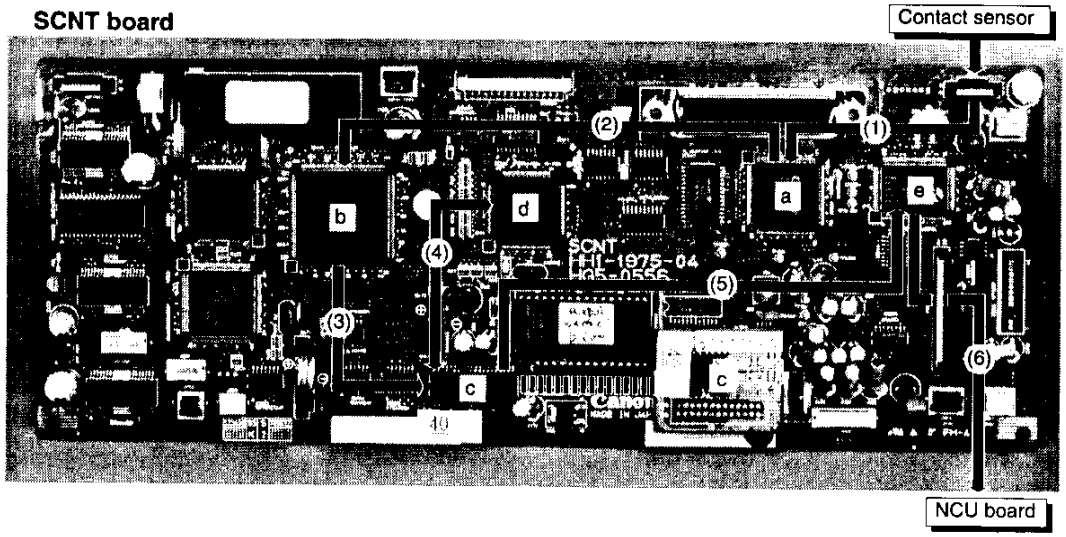
(2) The image processing IC converts analogue image data from the contact sensor to digital image data and sends them to the system controller IC.

(3) The system controller IC converts processed image data from serial data to parallel data, and writes them to the DRAM.

(4) The MPU encodes raw data in the DRAM using a soft codec, and rewrites the encoded data into the DRAM.

(5) The MODEM IC modulates the coded image data.

(6) The modulated data are then sent from the MODEM IC to the NCU board.



a Image processing IC
b System controller IC
c DRAM (on board +memory board)
d MPU
e MODEM IC

Figure 2-20 G3 Transmission Image Signal Flow

b) G3 Reception

(1) Image signals received by L1, L2, pass through the hybrid circuit in the NCU, and are amplified. The modem demodulates these images, and writes them to the DRAM.

(2) The MPU decodes the demodulated image data, checks errors, stores them in the DRAM, encodes the data and rewrites them into the DRAM.

(3) The system controller IC converts the decoded data from run-length data to raw data, and converts 8 dot/mm fax data into 360 dpi resolution converted printer data, and writes them to the DRAM.

(4) The system controller IC converts the resolution converted printer data to BJ printer head control signals, and then sends the signals to the BJ print head, via the BJ conroller IC. Simultaneously, the printer MPU sends motor control signals to the carriage motor and line feed motor, via the driver IC.

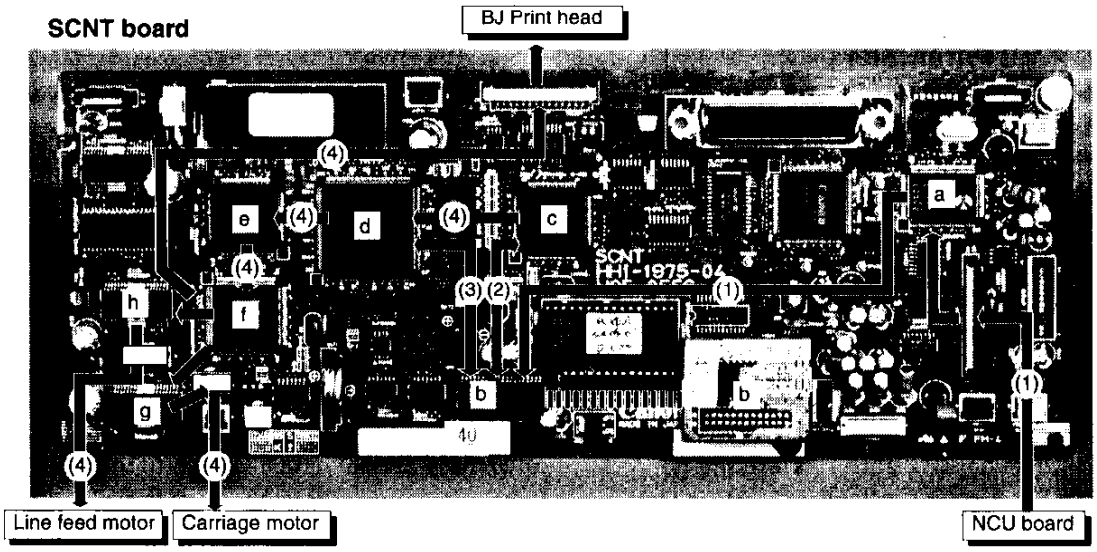


Figure 2-21 G3 Reception Image Signal Flow

7. COMMUNICATION SYSTEM OPERATIONS

7.1 FAX/TEL Switching

This fax is set to automatically switch between fax and telephone, on the same telephone line. If the other party is a fax, the fax is received automatically, and if the other party is a telephone, the alarm in the main unit is rung to alert the user.

7.1.1 Settings

(1) Press the *ANS HOOK UP-MANUAL* button to select automatic reception mode. (The **MANUAL-ANS** indicator goes off.)

(2) Set the user data **"RX MODE"** in **"RECEIVE(RX) SETUP"** to **"FAX/TEL AUTO SW"**.

(3) Set the operation after pseudo ring transmission using the user data **"F/T SWITCH ACTION"** in **"FAX/TEL AUTO SW"**. (**"RECEIVE" or "DISCONNECT"**)

7.1.2 Parameters

Item	Default setting	Setting switch	Selection range
RING START TIME (Pseudo Ring start time)	8 sec.	User data	0 to 30 sec.
F/T RING TIME (Pseudo Ring time)	15 sec.	User data	10 to 45 sec.
F/T SWITCH ACTION (Operation after FAX/TEL switching)	RECEIVE	User data	RECEIVE/ DISCONNECT
Pseudo RBT frequency	400 Hz	None	None (fixed)
Pseudo RBT transmission from CML on time until start (CNG detection time)	4 sec.	Service data #3 16	0 to 9 sec.
Pseudo RBT pattern on time	1000 ms	Service data #3 17	0 to 9990 ms
Pseudo RBT pattern off time (short)	0 ms	Service data #3 18	0 to 9990 ms
Pseudo RBT pattern off time (long)	2000 ms	Service data #3 19	0 to 9990 ms
Pseudo RBT transmission level	-18 dBm	Service data #3 24	-28 to -13 dBm
Pseudo ring frequency	25Hz	Service data #2 10	17Hz/25Hz/50Hz
Pseudo ring pattern on time	1000 ms	Service data #3 20	0 to 9990 ms
Pseudo ring pattern off time (short)	0 ms	Service data #3 21	0 to 9990 ms
Pseudo ring pattern off time (long)	2000 ms	Service data #3 22	0 to 9990 ms
CNG detection level	-47 dBm	Service data #3 23	-50 to -26 dBm

7.2 Answering Machine Connection

This connection is for effective use of an answering machine connected to the extension phone jack. If the other party is a telephone, the answering telephone records the message, and if the other party is a fax, the fax receives automatically.

7.2.1 Settings

(1) Connect the answering machine to the extension telephone jack, and set the answering machine to **"Answer"**.

(2) Press the fax's *ANS HOOK UP-MANUAL* button and select the answering mode. (The *ANS HOOK UP* indicator lights.)

(3) When putting the fax into reception mode by detecting no-sound on the line, set the user data **"ANS/FAX SWITCH"** to **"ON"**, then set the no-sound time with user data **"ANS/FAX SW TIME"**.

7.2.2 Parameters

Item	Default Setting	Setting Switch	Selection Range
ANS/FAX SWITCH	OFF	User data	ON/OFF
ANS/FAX SW TIME	4 sec.	User data	1 to 99 sec.
No-sound detection level	-48 dBm	Service data #3 26	-48 to -27 dBm
Signal detection time	60 sec.	Service data #3 25	0 to 999 sec.

7.3 Manual/Auto Reception Switching

Determines if the fax switches to document receive mode, after the fax rings for a specified time when the fax is in the manual receive mode.

7.3.1 Settings

(1) Set the **"MAN/AUTO SWITCH"** in the user data **"RX MODE"** to **"ON"**.

(2) Set the number of seconds that the fax will wait after detecting ringing signal from the telephone line before going into reception, using user data **"F/T RING TIME"** in **"MAN/AUTO SWITCH"**.

7.3.2 Parameters

Item	Default setting	Setting switch	Selection range
MAN/AUTO SWITCH	OFF	User data	ON/OFF
F/T RING TIME	10 sec.	User data	1 to 99 sec.

8. NEW FUNCTION

8.1 Auto Halftone

Auto Halftone is a new function, added with UHQ-VI.

a) Function

Auto halftone automatically distinguishes between text sections and photograph sections in a document, and applies the appropriate image processing to each section of the document. Using this function, there is no need for the user to adjust the document mode settings, as in the past.

Also, with the previous system, if a mixed, photograph and text document was set in the photograph mode, text sections were not reproduced clearly, and vice versa in the text mode setting. With Auto halftone, rather than setting one mode across the board for the whole document, each section receives the appropriate image processing, resulting in clear reproduction of photographs and text in the same image.

b) Operations

Image data scanned by the document sensor are entered into the image processing IC (UHQ-6), where Auto halftone processing is done.

The Auto halftone function automatically distinguishes between text sections and photograph sections in a document, and applies black and white, 2 gradation processing to text sections, and 64 gradation half tone processing to photograph sections.

NOTE

The aim of Auto halftone is to improve the quality of documents containing a mixture of text and intermediate tones. Therefore, this processing cannot be performed on documents such as blue prints, tracing paper, reversed negatives, or documents containing marker pen lines, etc.

c) Setting

Set the **"AUTO HALFTONE"** in the user data **"USER SETTINGS"** to **"ON"**.

NOTE

The Auto Halftone function is always used for copying, regardless of this setting.

1.MAINTENANCE LIST

1.1 Consumables

Level	Consumable	When
User	BJ cartridge (BC-20 / BC-21)	When **"REPLACE CARTRIDGE"** is displayed or when ink has run out.
	INK cartridge (BCI-21 Color / BCI-21 Black)	When using BC-21, one of the other of "YMC color" or "Black" has run out.
Service Technician	None	

1.2 Cleaning

For the cleaning procedure, see *2. HOW TO CLEAN PARTS on page 3-4.*

Level	Location	When
User	Main unit outer covers	When dirty.
Service Technician	Separation roller	When document separation performance deteriorates.
	Separation guide	When document separation performance deteriorates.
	Glass window (contact sensor)	When black vertical stripes appear in copied or transmitted images.
	Printer platen	When ink adheres to the platen.

NOTE

Cleaning the document feed roller

The document feed roller does not need to be cleaned, as the feeding operation is not affected by dirt, and there is no pre-scan operation.

1.3 Periodic Inspection

None

1.4 Periodic Replacement Parts

None

1.5 Adjustment Items

The following adjustments must be made on this fax.
For the adjustment procedure, see *3. ADJUSTMENT on page 3-6.*

Item	When
Shading data	When the SCNT board, or the lithium battery, or the contact sensor are replaced. Also, when image defects such as black spots appear in AUTO HALFTONE mode.
Vertical Alignment	When the vertical lines shift during Bi-directional printing.
Head gap	Head gap has been altered when Carriage ass'y, Carriage trailer ass'y, Pressure plate, Platen ass'y, Line feed roller were replaced and disassembled.

NOTE

"DATA ERROR PRESS SET KEY" is displayed. If you press the *SET* button, the shading data must also be registered again.

1.6 General Tools

Tool	Use
Phillips screwdriver	Removing/inserting screws
Flat bladed screwdriver	Removing/inserting screws
Precision Phillips screwdriver	Removing/inserting screws
Precision flat bladed screwdriver	Removing plastic tabs
Tweezers	Removing coil spring
Isopropyl alcohol (IPA)	Cleaning the cleaning location

1.7 Special Tools

Tool	Use	Part No.
Grease (FLOIL G311S)	Apply to specified parts	TKC-0953
Gap gauge (1.2mm)	For head gap adjustment	QY9-0016
Gap gauge (0.4mm)	For head gap adjustment	HY9-0017
BJ cartridge (BC-20)	For head gap adjustment,	———
Recommended paper	For re-registration of shading data	———

2. HOW TO CLEAN PARTS

2.1 Main Unit Outer Covers

Wipe with a dry, soft cloth.

2.2 Separation Roller

Open the operation panel, and wipe with a dry, soft cloth.

2.3 Separation Guide

Open the operation panel, and wipe with a dry, soft cloth.

2.4 Glass Window (contact sensor)

Wipe with a dry cotton swab, while pushing the contact sensor holder down, from the front side of the operation panel.

However, if the glass is very dirty, it would be better to remove the contact sensor ass'y to clean it properly. Refer to *the Parts Catalog (supplied separately)* for the Disassembly Method.

2.5 Printer Platen

Open the front cover, and wipe with a cloth moistened with a little water.

Be careful not to wipe off the grease from the pressure plate.

NOTE

If the parts above are very dirty, wipe with a cloth moistened with IPA (isopropyl alcohol).

Do not use tissue paper. Dust from the tissue paper causes static electricity.

Precautions when Using IPA

When cleaning with IPA, take care to prevent the IPA from splashing high-temperature parts. If IPA splashes high-temperature parts, leave for at least three minutes to allow the IPA to evaporate.

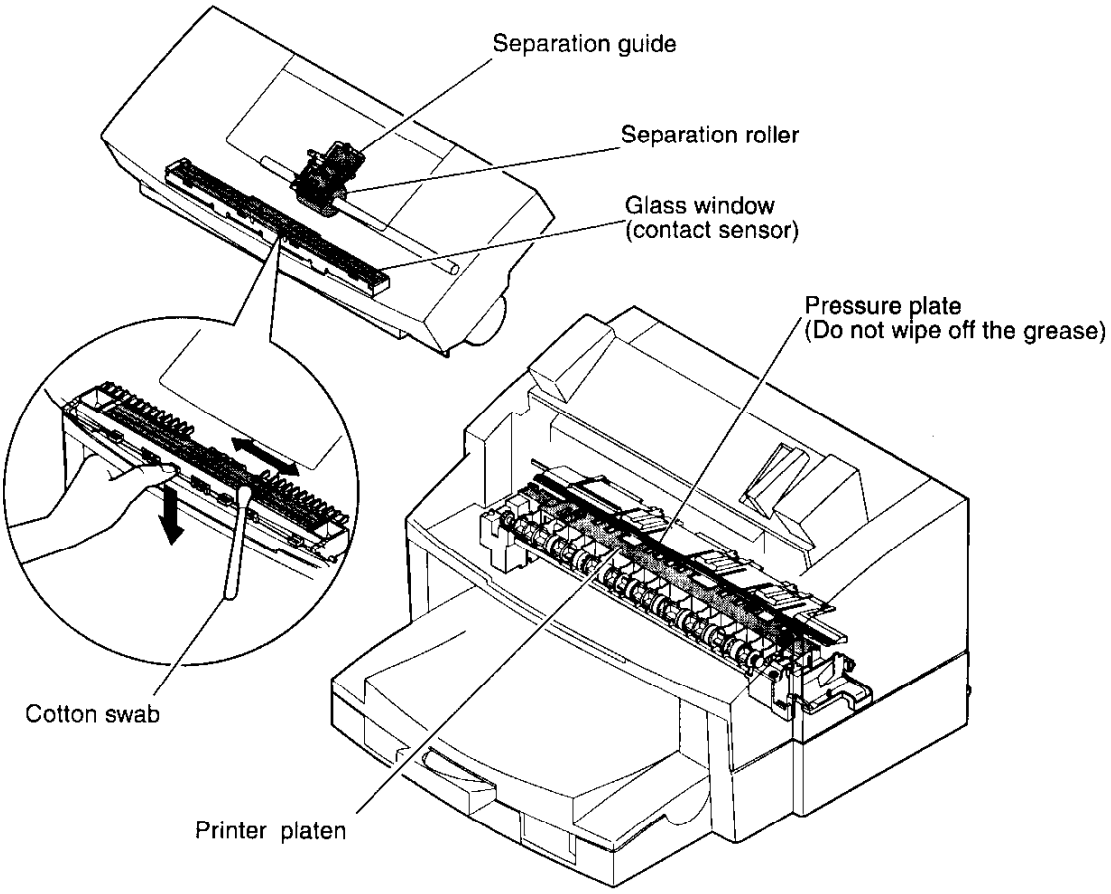


Figure 3-1 Cleaning Location

3. ADJUSTMENT

3.1 Shading Data Adjustment

a) Overview

If the SCNT board, lithium battery, or contact sensor has been replaced, **"DATA ERROR PRESS SET KEY"** is displayed or the image scanned in AUTO HALFTONE mode contains black dots, the shading data for contact sensor correction may be damaged. Re-enter the shading data by following the procedure below.

b) Tools required:

Recommended paper.

c) Procedure

1) Follow the procedure below and select CS SHADE ADJUST with the TEST MODE's 2:CS.

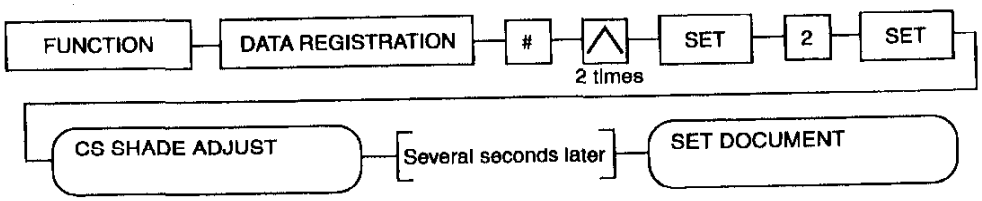


Figure 3-2 Shading Data Adjustment Operation 1

2) Place a white sheet of paper for scanning the shading data, and press the *START/COPY* button.

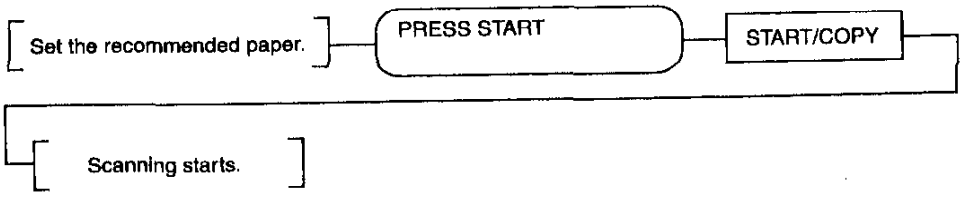


Figure 3-3 Shading Data Adjustment Operation 2

3) The paper is scanned and the shading data will be re-entered.
4) Execute copying operation and check the image.

3.2 Vertical Alignment Correction

a) Overview

Vertical alignment during bi-directional printing can be corrected by adjusting the print starting position. No tools are required for this adjustment.

b) Printing the test pattern

Follow the procedure below to print out the test pattern.

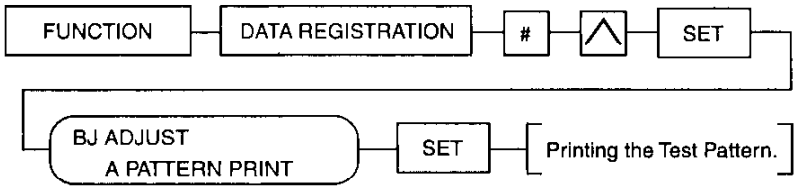


Figure 3-4 Printing the Test Pattern

The test pattern can be printed only when Black BJ Cartridge (BC-20) is used. Color BJ Cartridge (BC-21) cannot be used.

c) How to read the Test pattern

As shown in *Fig. 3-5*, the test pattern shows the HQ (normal mode), HS (economy mode) and uni-direction printing condition from the top. The respective vertical lines for HQ and HS can be moved left or right on the second row (of three rows). As shown in *Fig. 3-6*, adjust so that the vertical lines in the middle are correctly aligned.

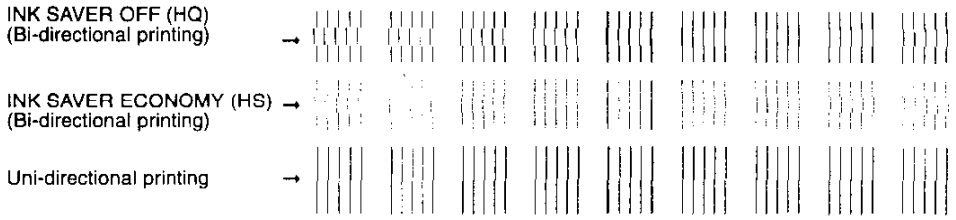


Figure 3-5 Test Pattern Sample

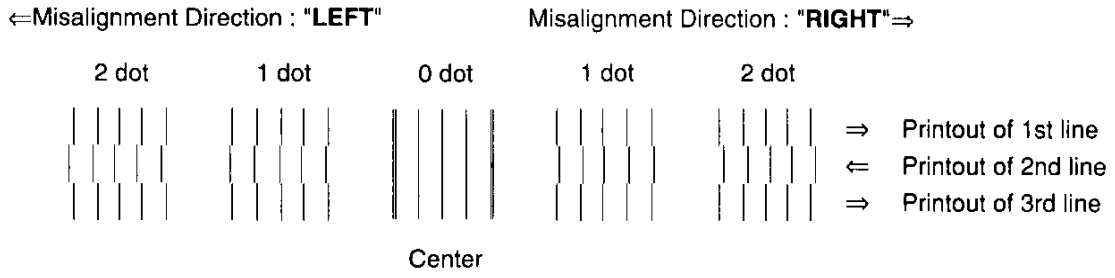


Figure 3-6 Correct Test Pattern

d) Correction procedure

The misaligned vertical lines in the middle, shown in *Fig. 3-7*, are described below.

(1) Check the correction direction for the 2nd line, and check the dot count. (In the example, a 2-dot correction to the right is necessary.)

(2) Determine the dot count required for the correction.
The correction can be done in 1/4-dot increments. To make a 2-dot correction, enter 8 (this gives a result of 2 when multiplied by 1/4).

(3) As shown in *Fig. 3-8*, make the correction for HQ and HS. (The flowchart shows the procedure for making a 2-dot correction to the right for the HQ and HS, respectively. The actual display may look different from the figure.)

(4) After making the correction, print out the test pattern. If there is any misalignment, do the correction again.

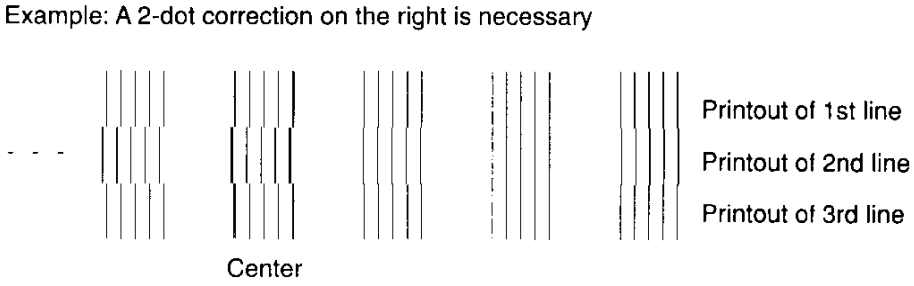

Example: A 2-dot correction on the right is necessary
Printout of 1st line
Printout of 2nd line
Printout of 3rd line
Center

Figure 3-7 Sample Test Pattern with Vertical Misalignment

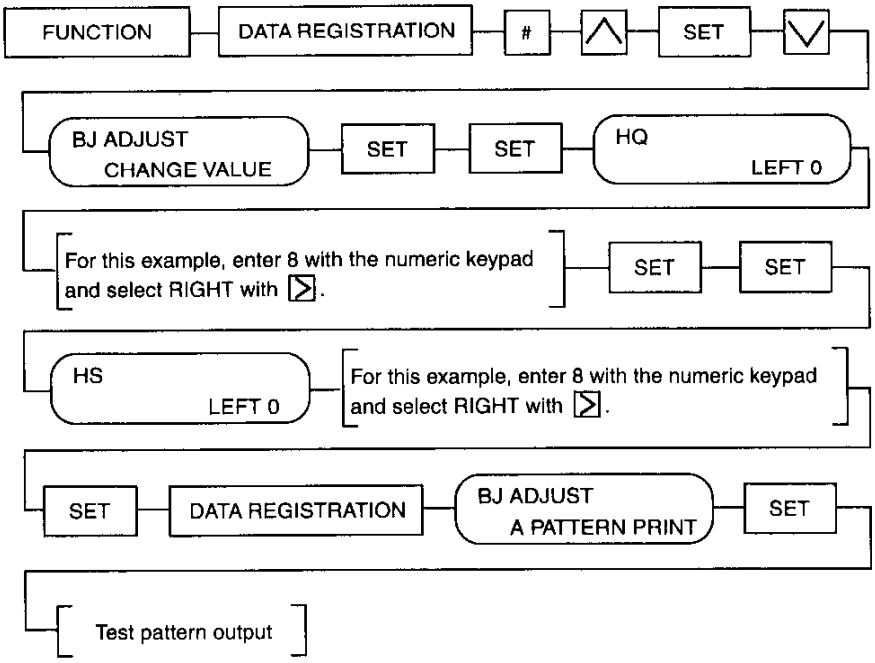


Figure 3-8 Vertical Line Misalignment Correction Procedure

3.3 Head Gap Adjustment

a) When adjustment is required

The head gap must be adjusted if any of the following problems occur:

- The paper and BJ cartridge rub against each other.
- Vertical lines incline after each line break. (See *Fig. 3-9*)

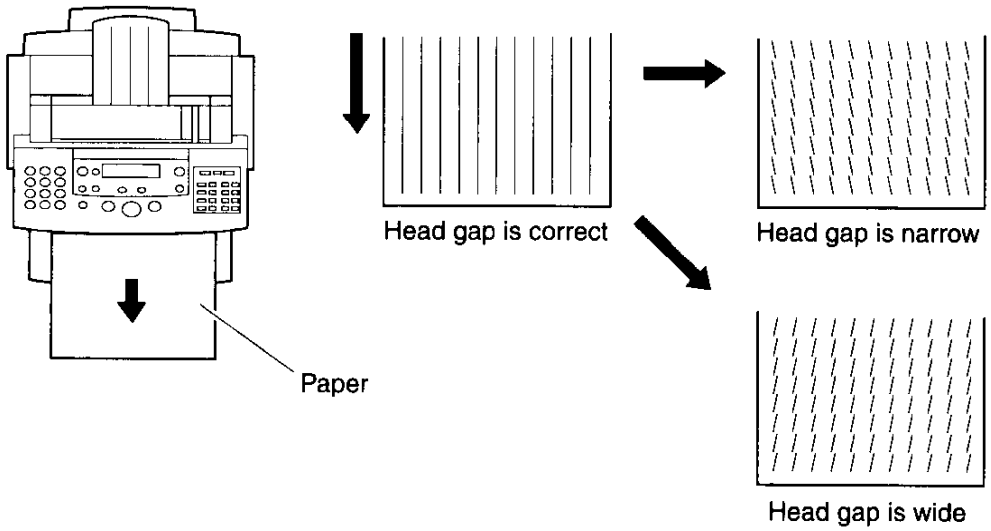


Figure 3-9 Output Sample When there is no Adjustment

When any of the following units or their component parts are replaced:
Applicable units
Carriage ass'y, Carriage trailer ass'y, Pressure plate, Platen ass'y, Line feed roller unit.

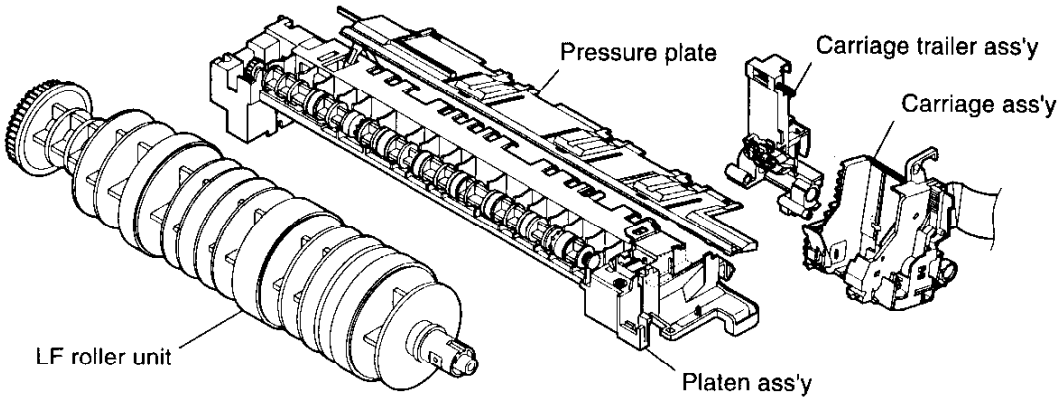


Figure 3-10 Head Gap Adjustment Parts

b) Required adjustment tools

Tool	Use
Gap gauge (1.2 mm)	For head gap measurement
Gap gauge (0.4 mm)	For head gap measurement
Phillips screwdriver	Removing/inserting screws
Precision flat bladed screwdriver	For head gap adjustment
BJ cartridge (BC-20)	For head gap measurement (During the adjustment, the head's nozzles will come into contact with the gap gauge. Therefore, do not use the customer's BJ cartridge. Also, since the BJ cartridge's weight will have some effect, always use a fresh BJ cartridge.)

c) Adjustment procedure

c-1) Adjustment preparation

Remove the scanner ass'y, upper cover, and rear cover.

Refer to *the Parts Catalog* and remove the scanner ass'y, upper cover, and rear cover. Disassemble the print ass'y as shown in *Fig. 3-11*.

Cartridge guide removal

Refer to the figure and remove the cartridge guide.

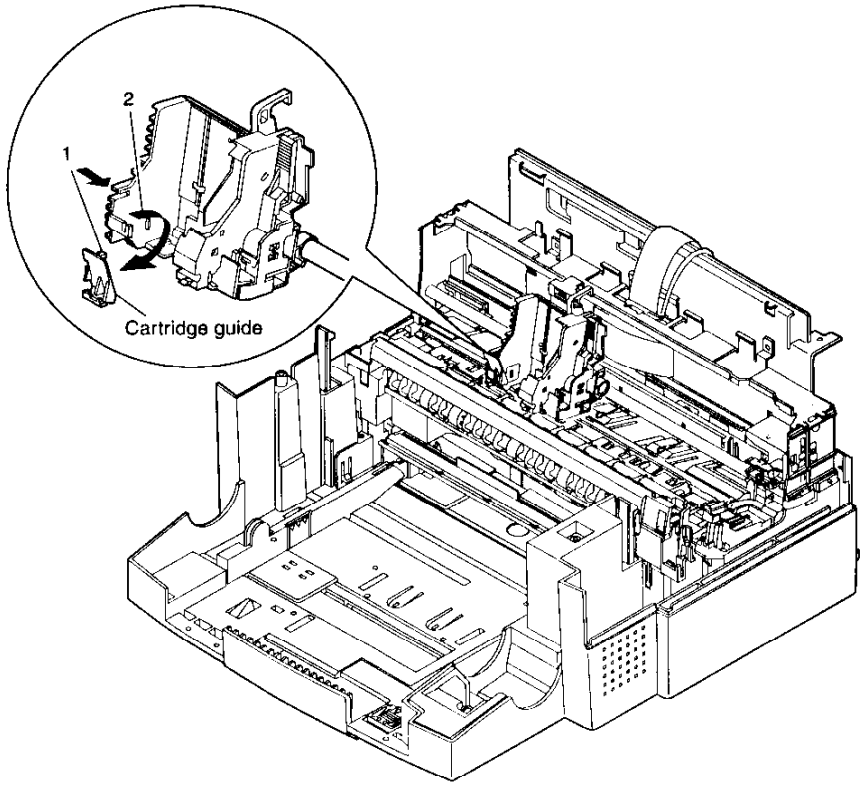


Figure 3-11 Adjustment Preparation

c-2) Adjustment

Adjust at the three places indicated by A, B, and C in *Fig. 3-13*.

The head gap can be adjusted with the carriage dial. Use a precision flat-bladed screwdriver to turn the dial and adjust the head gap.

The dial has a total of 16 click stops, from the maximum to minimum head gap. Each click stop adjusts the head gap by 0.05 mm.

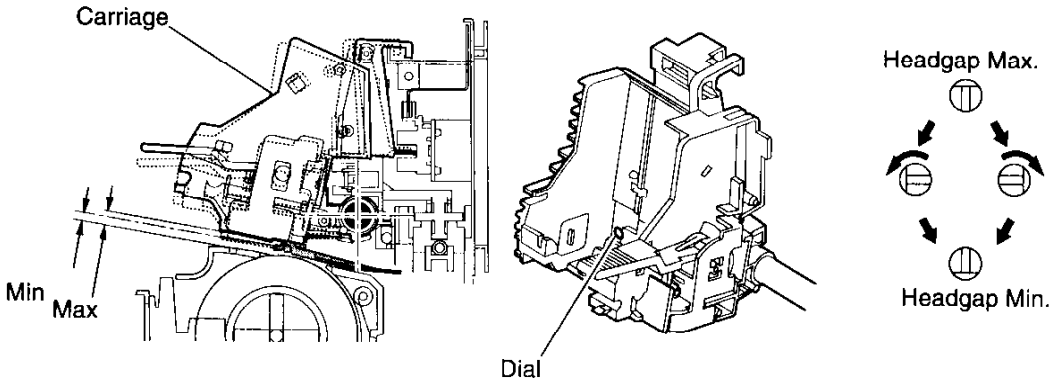


Figure 3-12 Adjustment Dial

Adjustment at position A

(1) At position A in *Fig. 3-13*, place the 0.4mm gap gauge on the 1.2mm gap gauge.

(2) Install the BJ cartridge on the Carriage ass'y and use your finger to pull up the belt furthest away from the carriage and let it pass through the top of the gap gauge.

When moving the carriage, first pull out the carriage belt for correct adjustment and then move the carriage. Also note that the carriage belt can come off easily so be careful that it does not come off. After completing the adjustment, check that the belt did not come off.

(3) Adjust the head gap so that the BJ head only moves the 0.4mm gap gauge. Remove the BJ cartridge and adjust the dial.

Since one click stop adjusts it by 0.05 mm, use four click stops (0.2 mm each) for a rough adjustment.

- If the head comes into contact at 1.2 mm, increase the head gap.
- If the head comes into contact at 0.4 mm, decrease the head gap.
- If the head comes into contact only at 0.4 mm, the head gap is correct.

(4) Repeat steps (2) and (3) until the adjustment is completed.

Adjustment at position B and C

Either B or C can be adjusted first. In any case, make sure to adjust both B and C. The procedure is the same for both.

(1) In the same way as for A, stack the two gap gauges.

(2) In the same way for as A, adjust the head gap so that the BJ head only moves the 0.4mm gap gauge.In this case, however, set two click stops at a time with the dial for B and C. If it moves too much, the head gap adjustment for A might be thrown off.

d) Adjustment check

After completing the adjustment at A, B, and C, place the 1.2mm gap gauge at the three points and check that the BJ head does not come into contact with the gauge.

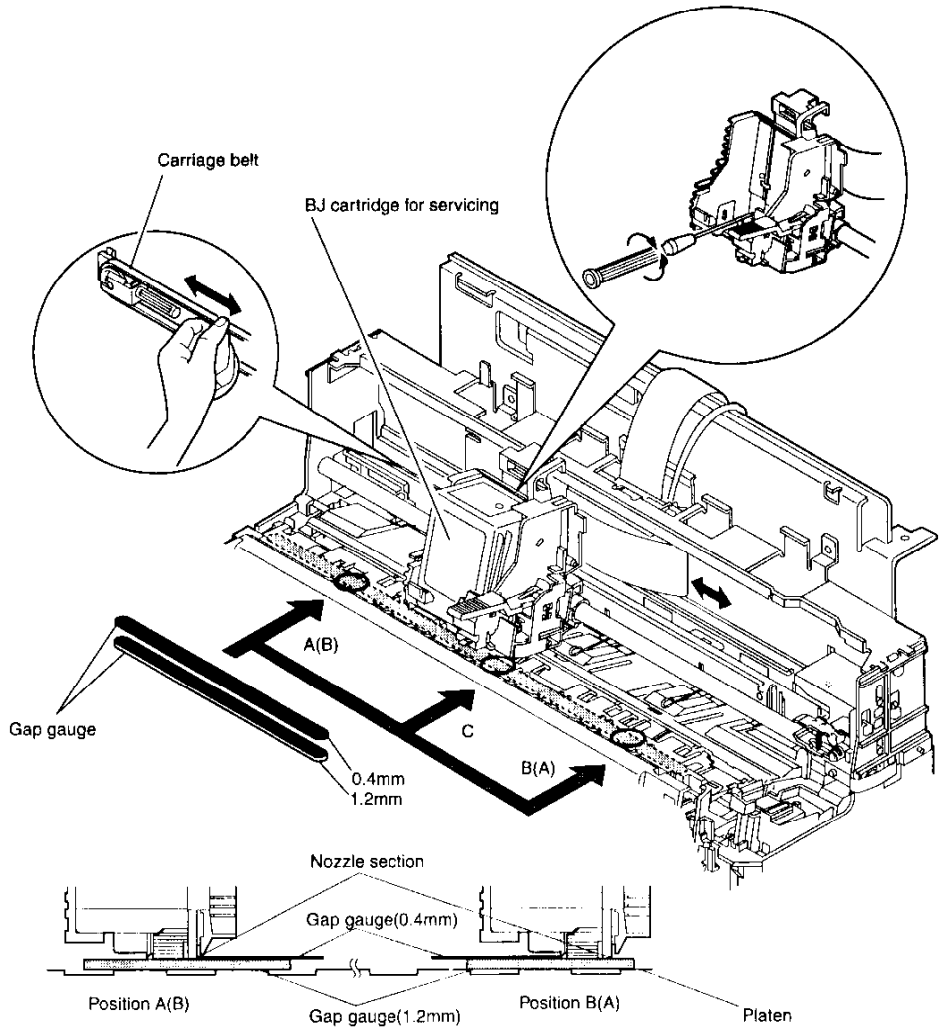


Figure 3-13 Head Gap Adjustment

4. TROUBLESHOOTING

4.1 Troubleshooting Index

For troubleshooting, use the troubleshooting index below to investigate the cause of the problem and refer to the specified page for countermeasures.

Problem

- **General errors** **Page 3-27.**
  - The unit does not power on. (Evaluation criteria: Look at the unit in question.)
  - The display looks abnormal. (Evaluation criteria: Check it with the operation panel test.)
  - The keys do not work. (Evaluation criteria: Check it with the operation panel test.)
  - No sound from the speaker

- **Errors shown on the display (Evaluation criteria: Look at the unit in question.)**
  - The error message can be checked. **Page 3-15.**
  - The error code can be checked. **Page 3-18.**

- **Printing problem (Evaluation criteria: Test printing is no good.)**
  - The paper is not fed properly. **Page 3-28.**
    The LF motor does not run.
    The lifting plate does not move.
  - The printing operation is abnormal. **Page 3-28.**
    Nothing is printed.
    The carriage motor does not run.
  - Printing quality error **Page 3-29.**
    (Evaluation criteria: Look at the printing result.)
    Print is not clear.
    Blurred or smudged characters.
    Smudges appear on back of printed page.
    Irregular print quality.
    Print head needs cleaning.
    Horizontal white stripes appear on some entirely black parts of the print.

- **Scanning problem (Evaluation criteria: Test printing is good, but the copied image is no good.)**
  - The document is not fed. **Page 3-30.**
    The document feed motor does not run.
    The document slips against the rollers.
    The document does not separate.
    Faulty scanner unit's sensors
  - The scanning image is abnormal. **Page 3-31.**
    Nothing is printed.
    The image has vertical stripes.
    The image has thick vertical stripes.
    The half-tone image contains black dots.

4.2 Errors Shown on the Display

4.2.1 User error message

Look for the applicable error message and execute the appropriate countermeasures.

"BUSY/NO SIGNAL" (#005/#018)

Cause: The receiving fax did not answer within 35 seconds. (T1 timer over)
Solution: Contact the other party and have them check their fax.You can try to send the document manually. For an overseas call, add pauses to the registered number.
Cause: The touch tone/rotary pulse setting on your fax is incorrect.
Solution: Set your fax to the setting that matches your telephone line.
Cause: The other party is not using a G3 machine.
Solution: Contact the other party and have them send or receive the document using a G3 machine.
Cause: The other party's fax is not working.
Solution: Contact the other party and have them check their fax.
Cause: The telephone number you dialed is busy.
Solution: Try sending the document at a later time.

"CANNOT DO POLLING RX" (#021)

Cause: Polling was impossible because the polling ID did not match.
Solution: Check that the other party's polling ID is "255" or "11111111", then try again.

"CHECK DOCUMENT" (#001/#011)

Cause : Document jam. This is displayed when the document sensor detects paper, but the document edge sensor cannot detect the leading edge of the document with 15 seconds from the start of the feed operation.
Solution: Clear the document jam.
Cause : The fax tried to poll another unit but the other unit did not have a document to send.
Solution: Contact the other party and have them set the document for polling.

"CHECK PAPER SIZE"

Cause: The size of the paper loaded in the paper cassette is different from the paper size set by the "SELECT PAPER SIZE" of user data "FAX PRINTER SETUP".
Solution: Set the "SELECT PAPER SIZE" of user data "FAX PRINTER SETUP" to the size of the paper loaded in the paper cassette.

"CHECK PRINTER" (##332~##343 and ##348)

Cause: The printer's internal unit has malfunctioned.
Solution: Set the service data #1 SSSW SW01 bit 0 to "1" and check the service code. Refer to the countermeasures for that error code.

"DATA ERROR PRESS SET KEY"

Cause: The registration data in the SRAM was destroyed and a checksum error occurred due to a dead lithium battery or SRAM failure.

Solutions: (1) Press the *SET* button, and turn the power off and on again.
(2) Replace the lithium battery.
(3) Replace the SCNT board.

"DELETE FILE PRESS SET KEY"

Cause: The image management data in the SRAM was destroyed and a checksum error occurred due to a dead lithium battery or SRAM failure.

Solutions: (1) Press the *SET* button, make memory transmission reservation, and turn the power off and on again.
(2) Replace the lithium battery.
(3) Replace the SCNT board.

Cause: Immediately after replacing the SCNT board or lithium battery.

Solution: Press the *SET* button and register data again.

"DOC. TOO LONG" (#003)

Cause: The document is longer than 39.4"(1m).

Solution: Use a copy machine to make a reduced copy of the document. Then send again.

Cause: It took more than 32 minutes to send or copy a document. It took more than 32 minutes to receive a document.

Solution: Divide the document and send or copy each part separately. Contact the other party. Have them divide the document and send each part separately.

"HANG UP PHONE"

Cause: The handset or the extension telephone is off the hook.

Solution: Put the handset or the extension telephone back on the hook.

"INSTALL CARTRIDGE"

Cause: The BJ cartridge is not set.

Solution: Set the BJ cartridge.

"MEMORY FULL" (#037)

Cause: The fax's memory is full because it has received too many documents.

Solutions: (1)Print out any documents which are stored in memory. Then start the operation again.
(2)If the memory contains any facsimiles you don't need, delete them.
(3)You cannot receive a fax was scanned with fine graphic images.

Cause: The fax's memory is full because you tried to send too many pages at once.

Solution: Divide the document and send each part separately.

"NO ANSWER"

Cause: The receiving fax machine does not answer.

Solution: Make sure you dialed the correct number. Try again later.

"NO RX PAPER" (#012)

Cause: The receiving fax machine declares no paper in DIS, or its memory is full.

Solution: Contact the other party, and ask them to put paper in their machine, or to clear their fax machine's memory.

"NO TEL #" (#022)

Cause: The button you pressed has no number registered for One-Touch Speed Dialing, Coded Speed Dialing, or Group Dialing.

Solution: Print a list of registered numbers and make any corrections needed, then try again.

"NOT AVAILABLE NOW"

Cause: One-touch or coded speed dial already registered.

Solution: Check the contents of the one-touch or coded speed dialling registration, then try again.

"REC. PAPER JAM" (#009)

Cause: Paper jam.

Solution: Clear the paper jam.

"REPLACE CARTRIDGE"

Cause: The BJ cartridge has run out of ink.

Solution: Replace the BJ cartridge.

"SET CARTRIDGE THEN CARTRIDGE COOLING"

Cause: The BJ cartridge is hot.

Solution: Wait until the message disappears.

"START AGAIN"

Cause: An error occurred on the phone line or in the system.

Solution: Start the procedure again from the beginning.

"SUPPLY REC. PAPER" (#009)

Cause: The fax is out of paper.

Solution: Add more paper to the paper cassette. Make sure the stack is below the limit mark.

4.2.2 Error codes

a) Service error code output

When service data #1 SSSW SW01 bit 0 is set to "1", then service error codes are printed on the activity management reports, reception result reports and error transmission reports, when communication ends in an error. Also, the following is displayed, when an error occurs.

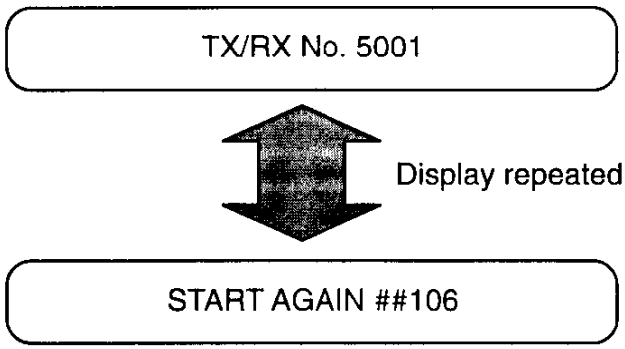


Figure 3-14 Service Error Code Display

b) Error code countermeasures

From item c), all the error codes which the unit can display are listed. The separate *G3 Facsimile Error Code List* does not specify the countermeasures for resolvable error codes. Also refer to this list when an error code appears.

The *G3 Facsimile Error Code List* does not specify countermeasures for all error codes. The countermeasures that are specified in the *G3 Facsimile Error Code List* are included here as specific countermeasures for your reference.

- **Increase the transmission level**

  Set service data #2 MENU Parameter No.07 to 0 (dBm).
- **Decrease the transmission level**

  Set service data #2 MENU Parameter No.07 to -15 (dBm).
- **Echo measures**

  Change the following bit switches of service data #1 SSSW SW03.

  Bit 4:1 Ignore the first DIS signal sent by the other fax machine.
  0 Do not ignore the first DIS signal sent by the other fax machine.
  Bit 5:1 Transmit a tonal signal (1850 or 1650 Hz) when the other fax machine sends a DIS signal.
  0 Do not transmit a tonal signal when the other fax machine sends a DIS signal.
  Bit 6:1 Transmit a 1850-Hz tonal signal when bit 5 is 1.
  0 Transmit a 1650-Hz tonal signal when bit 5 is 1.
  Bit 7:1 Transmit a tonal signal before sending a CED signal.
  0 Do not transmit a tonal signal before sending a CED signal.

- **EPT (Echo Protect Tone)**
  Change service data #1 SSSW SW03 bit 1.
  Bit 1:1 Transmit an echo protect tone.
  0 Not transmit an echo protect tone.
- **Adjust NL equalizer.**
  Set service data #2 MENU Parameter No.05 to "ON".
- **Reduce the transmission start speed.**
  Reduce the transmission speed by changing user data "SYSTEM SETTINGS" "TX START SPEED".
- **Loosen the TCF judgment standard.**
  Not available for this fax.
- **Loosen the RTN transmission conditions.**
  Change service data #3 NUMERIC Param. Parameter No.02 to 04.
  No.02 Percentage of errors in all lines : Set close to 99%.
  No.03 Number of lines of burst condition : Set close to 99 lines.
  No.04 Lines below the burst condition : Set close to 99 times.
- **Increase the no-sound time after CFR reception.**
  Change service data #1 SSSW SW04 bit 4 to "1".
  Bit 4:1 Time when the low-speed signal is ignored after sending a CFR signal: 1500 ms
  0 Time when the low-speed signal is ignored after sending a CFR signal: 700 ms

c) ERROR CORD LIST for MultiPASS C2500/CFX-B380IF

New error codes indicate *"new"* in this list.

• User error code

No.	Tx or Rx	Definition
#001	[TX]	Paper Jam
#003	[TX/RX]	Copy Page, Communication Time Over
#005	[TX/RX]	Initial ID (T1) Time Over
#009	[RX]	Recording Paper Jam or Out of Paper
#011	[RX]	Polling Error
#012	[TX]	Other party Out of Paper
#018	[TX/RX]	Automatic Dialing Error
#021	[RX]	DCN during Polling Rx
#022	[TX]	Call Failure
#037	[RX]	Image Memory Full
#039	[TX]	Closed Network Tx Failure
#052	[RX]	Image memory full by no ink error
#995	[TX/RX]	Memory Communication reservation cancellation

• Service error code

No.	Tx or Rx	Definition
##100	[TX]	Excessive Repeat Protocol during Rx
##101	[TX/RX]	Modem Speed Different from Other Party
##102	[TX]	Fall Back Failure during Tx
##103	[RX]	Fail to Detect EOL for 5 Seconds (15 seconds for CBT) during Rx
##104	[TX]	RTN or PIN Received during Tx
##106	[RX]	Fail to Receive Protocol for 6 Seconds when Waiting for Protocol during Rx
##107	[RX]	Fall Back Failure on Tx Side during Rx
##109	[TX]	Receive Signals Other than DIS, DTC, FTT, CFR or CRP after DCS Tx and Exceed the Number of Protocol re-transmissions during Tx
##200	[RX]	Fail to Detect Picture Rx Carrier for 5 Seconds during Rx
##201	[TX/RX]	DCN received Other than Normal Binary Protocol
##204	[TX]	Receive DTC without Tx Data
##220	[TX/RX]	System Error (main program runaway)
##224	[TX/RX]	Abnormal Protocol during G3 Communication
##226	[TX/RX]	Stack Pointer Not within RAM Range
##229	[RX]	Recording Unit Locked for 1 Minute
##232	[TX]	ENCODE Control Unit Malfunction
##237	[RX]	DECODE Control Unit Malfunction
##238	[RX]	PRINT Control Unit Malfunction
##261	[TX/RX]	System Error between Modem and SCNT
##280	[TX]	Excessive Repeat Protocol Command during Tx
##281	[TX]	Excessive Repeat Protocol Command during Tx
##282	[TX]	Excessive Repeat Protocol during Tx
##283	[TX]	Excessive Repeat Protocol during Tx
##284	[TX]	DCN Reception after TCF Transmission

	No.	Tx or Rx	Definition
	##285	[TX]	DCN Reception after EOP Transmission
	##286	[TX]	DCN Reception after EOM Transmission
	##287	[TX]	DCN Reception after MPS Transmission
	##288	[TX]	Receive Signals Other than PIN, PIP, MCF, RTP or RTN after EOP Transmission
	##289	[TX]	Receive Signals Other than PIN, PIP, MCF, RTP or RTN after EOM Transmission
	##290	[TX]	Receive Signals Other than PIN, PIP, MCF, RTP or RTN after MPS Transmission
new	##332	[TX/RX]	Printer control DRAM check error
new	##333	[TX/RX]	Printer control ROM check error
new	##334	[TX/RX]	Printer control EEPROM check error
new	##335	[TX/RX]	Data transmission error between the system control section and printer control section
new	##336	[TX/RX]	BJ head abnormal temperature error
new	##337	[RX]	BJ head temperature sensor error
new	##338	[RX]	Printing position correction failed
new	##339	[RX]	BJ head voltage malfunction error
new	##340	[TX/RX]	Home position error
new	##341	[TX/RX]	Maintenance jet waste ink capacity full
new	##342	[TX/RX]	Cleaning absorption waste ink capacity full
new	##343	[TX/RX]	Ink detection waste ink capacity full
new	##348	[TX/RX]	Ink detection sensor error
	##750	[TX]	Exceed Repeat Protocol Due to Failure to Receive Significant Signals after Transmitting PPS-NULL during ECM Tx
	##752	[TX]	Receive DCN after PPS-NULL Transmission during ECM Tx
	##753	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-NULL Transmission during ECM Tx
	##754	[TX]	Exceed Retransmit Protocol after PPS-NULL Transmission during ECM Tx
	##755	[TX]	Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after PPS-MPS Transmission during ECM Tx
	##757	[TX]	Receive DCN after PPS-MPS Transmission during ECM Tx
	##758	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-MPS Transmission during ECM Tx
	##759	[TX]	Exceed Retransmit Protocol after PPS-MPS Transmission during ECM Tx
	##760	[TX]	Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after PPS-EOM Transmission during ECM Tx
	##762	[TX]	Receive DCN after PPS-EOM Transmission during ECM Tx
	##763	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-MPS Transmission during ECM Tx
	##764	[TX]	Exceed Retransmit Protocol after PPS-EOP Transmission during ECM Tx

No.	Tx or Rx	Definition
##765	[TX]	Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after PPS-EOP Transmission during ECM Tx
##767	[TX]	Receive DCN after PPS-EOP Transmission during ECM Tx
##768	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after PPS-EOP Transmission during ECM Tx
##769	[TX]	Exceed Retransmit Protocol after PPS-EOP Transmission during ECM Tx
##770	[TX]	Exceed Repeat Protocol Limit Due to Failure to Receive Significant Signals after Transmitting EOR-NULL during ECM Tx
##772	[TX]	Receive DCN after EOR-NULL Transmission during ECM Tx
##773	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-NULL Transmission during ECM Tx
##774	[TX]	Receive ERR after EOR-NULL Transmission during ECM Tx
##775	[TX]	Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after EOR-MPS Transmission during ECM Tx
##777	[TX]	Receive DCN after EOR-MPS Transmission during ECM Tx
##778	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-MPS Transmission during ECM Tx
##779	[TX]	Receive ERR after EOR-MPS Transmission during ECM Tx
##780	[TX]	Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after EOR-EOM Transmission during ECM Tx.
##782	[TX]	Receive DCN after EOR-EOM Transmission during ECM Tx
##783	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-EOM Transmission during ECM Tx
##784	[TX]	Receive ERR after EOR-EOM Transmission during ECM Tx
##785	[TX]	Exceed Protocol Retransmission Limit Due to Failure to Receive Significant Signals after EOR-EOP Transmission during ECM Tx.
##787	[TX]	Receive DCN after EOR-EOP Transmission during ECM Tx
##788	[TX]	Exceed Protocol Retransmission Limit or T5 Time (60 seconds) after EOR-EOP Transmission during ECM Tx
##789	[TX]	Receive ERR after EOR-EOP Transmission during ECM Tx
##790	[RX]	Transmit ERR after EOR-Q Reception during ECM Rx
##791	[TX/RX]	Receive Non-Significant Signals during ECM Mode Procedures
##792	[RX]	Fail to Detect PPS-NULL between Partial Pages during ECM Rx
##793	[RX]	Time Over Due to Failure to Receive Valid Frame during High Speed Signal Rx upon ECM Rx
##794	[TX]	Receive All 0 PPR during ECM Tx
##795	[TX/RX]	Trouble in the decoding processing during communication
##799	[TX]	System Error

e) New error codes and recovery methods

332 [TX/RX] Printer control DRAM check error

Cause: Printer control DRAM malfunction, or SCNT board malfunction.
Countermeasure: (1) Turn the power OFF/ON.
(2) Replace the SCNT board.

333 [TX/RX] Printer control ROM check error

Cause: Printer control ROM malfunction, or SCNT board malfunction.
Countermeasure: (1) Turn the power OFF/ON.
(2) Replace the SCNT board.

334 [TX/RX] Printer control EEPROM check error

Cause: Printer control EEPROM data is damaged.
Countermeasure: EEPROM data are automatically initialized when this error occurs. Check the ink capacity of the ink suction unit waste ink absorber, and input the waste ink absorber capacity value, corresponding to the amount of absorbed ink.
Cause: Printer control EEPROM malfunction, or SCNT board malfunction.
Countermeasure: (1) Turn the power OFF/ON.
(2) Replace the SCNT board.

335 [TX/RX] Data communication error between system control section and printer control section

Cause: SCNT board malfunction.
Countermeasure: (1) Turn the power OFF/ON.
(2) Replace the SCNT board.

336 [TX/RX] BJ head temperature malfunction

Cause: BJ cartridge (BJ head) malfunction.
Countermeasure: (1) Turn off the power and pull out the power cord. Let the machine stand for a while, so that the BJ head can cool down.
(2) Replace the BJ cartridge.
Cause: SCNT board malfunction.
Countermeasure: Replace the SCNT board

337 [RX] BJ head temperature sensor error

Cause: BJ cartridge (BJ head) malfunction.
Countermeasure: Replace the BJ cartridge.
Cause: SCNT board malfunction.
Countermeasure: Replace the SCNT board.

338 [RX] Printing position correction failed

Cause: Carriage movement prevented by one of the following.
Damaged shaft.
Parts deformed. (Carriage or trailer)
Insufficient grease.

Countermeasure: Replace the shaft.
Replace the deformed parts.
Apply more grease.

Cause: Bi-directional print displacement correction failed because the carriage motor is out of step, or some similar reason.

Countermeasure: Replace the carriage motor.

339 [RX] BJ head voltage malfunction error

Cause: BJ cartridge (BJ head) malfunction.

Countermeasure: (1) Switch power OFF/ON.
(2) Replace BJ cartridge.

Cause: SCNT board malfunction.

Countermeasure: Replace SCNT board.

340 [TX/RX] Home position error

Cause: Foreign body in carriage section.

Countermeasure: Open printer cover, and remove foreign body.

Cause: Loose carriage belt.

Countermeasure: Replace carriage belt.

Cause: Trailer or Carriage Home position detection tabs is damaged or bent parts.

Countermeasure: Replace the damaged or bent parts.

Cause: Carriage motor does not work.

Countermeasure: (1) Switch power OFF/ON.
(2) Replace carriage motor.

Cause: Carriage position cannot be detected. (Home position sensor breakdown, or BJ controller malfunction)

Countermeasure: (1) Switch power OFF/ON.
(2) Replace carriage cable with one that has a home position sensor attached.
(3) Replace the SCNT.

341 [TX/RX] Maintenance jet waste ink capacity full

Cause: The ink absorber for the maintenance jet is full of waste ink.

Countermeasure: (1) Turn the power OFF/ON.

(2) Replace the maintenance jet waste ink absorber. Reset the maintenance jet ink absorber capacity to 0, in the SSSW #7 PRINTER 4 INK ABSOBER CAPA. However, if the capacity of the ink absorber is unclear, register a value, corresponding to the quantity of absorbed ink.

(3) Replace the SCNT board, and register a value for the absorption capacity, corresponding to the quantity of absorbed ink.

342 [TX/RX] Cleaning absorption waste ink capacity full

Cause: The ink absorber for the cleaning absorption is full of waste ink.

Countermeasure: (1) Turn the power OFF/ON.

(2) Replace the cleaning absorption waste ink absorber. Reset the cleaning absorption ink absorber capacity to 0, in the SSSW #7 PRINTER 4 INK ABSOBER CAPA. However, if the capacity of the ink absorber is unclear, register a value, corresponding to the quantity of absorbed ink.

(3) Replace the SCNT board, and register a value for the absorption capacity, corresponding to the quantity of absorbed ink.

343 [TX/RX] Ink detection waste ink capacity full

Cause: The ink absorber for the ink detection is full of waste ink.

Countermeasure: (1) Turn the power OFF/ON.

(2) Replace the ink detection waste ink absorber. Reset the ink detection ink absorber capacity to 0, in the SSSW #7 PRINTER 4 INK ABSOBER CAPA. However, if the capacity of the ink absorber is unclear, register a value, corresponding to the quantity of absorbed ink.

(3) Replace the SCNT board, and register a value for the absorption capacity, corresponding to the quantity of absorbed ink.

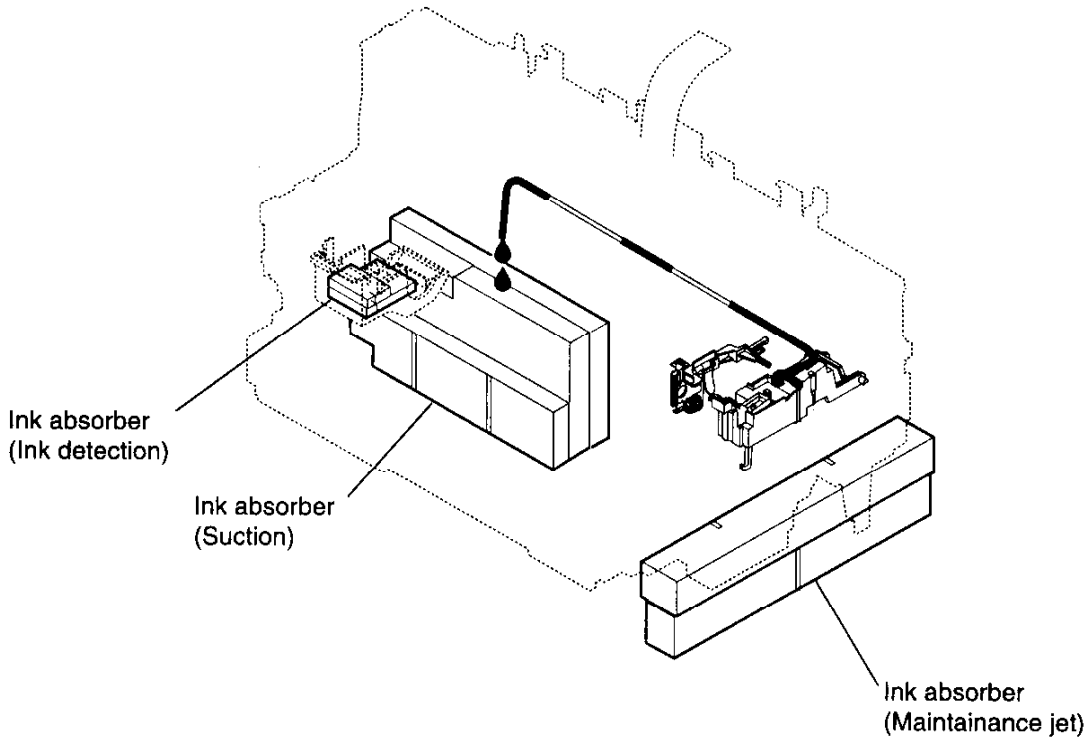


Figure 3-15 Waste Ink Absorber

##348 [TX/RX] Ink detection sensor error

Cause: Ink has adhered to the ink detection sensor.
Countermeasure: Remove the ink, etc., from the sensor's slit.
Cause: The ink detection sensor is faulty.
Countermeasure: Replace the ink detection sensor.

4.3 Errors not Shown on the Display

4.3.1 General errors

• The unit does not turn on. (Evaluation criteria: Look at the actual unit.)

(1) Check the power cord connection.
(2) Check the power supply unit's fuse (F1).
(3) Check the connection between the SCNT board (POWER1) and power supply unit.
(4) Replace the power supply unit.

• The display looks abnormal. (Applicable test mode: Operation panel test)

Nothing is displayed.

(1) Check the connection between the OPCNT board (J2) and SCNT board (JOPCNT1).
(2) Replace the OPCNT board.
(3) Replace the SCNT board.

Part of the LCD panel does not display anything.

(1) Check for LCD problems with the test mode.
(2) Check the connection between the OPCNT board (J2) and SCNT board (JOPCNT1).
(3) Replace the OPCNT board. (Faulty LCD)
(4) Replace the SCNT board.

• The keys do not work. (Applicable test mode: Operation panel test)

(1) If the test mode can be used, check for faulty keys.
(2) Replace any broken keys.
(3) Check the connection between the OPCNT board (J2) and SCNT board (JOPCNT1).
(4) Replace the OPCNT board. (Faulty tact switch or OPCNT control IC [IC1])
(5) Replace the SCNT board.

• No sound from the speaker

(1) Check the connection of the speaker and SCNT board (JSP1).
(2) Replace the speaker.
(3) Replace the SCNT board.

4.3.2 Printing problem

- **Faulty printing (Evaluation criteria: Test print is no good.)**
  - **The paper is not fed correctly. (Evaluation criteria: Look at the actual unit.)**

The LF motor does not run.

(1) Check the connection from the line feed motor to the SCNT board (JLF1).
(2) Check the line feed motor's resistance. 30 Ω/1 phase is normal. (*Fig. 3-16*)
(3) Replace the line feed motor.
(4) Replace the SCNT board.

The lifting plate does not move.

(1) Check for any deformation or damage of the drive section's (*Fig. 2-6*) gears, cams, etc.
(2) Check the installation of the lifting plate control arm and for any deformation.
(3) Replace the lifting plate control arm.

- **The printing operation is abnormal.**

Nothing is printed.

(1) Remove the BJ cartridge and re-install it.
(2) Execute cleaning five times, and try printing again.
(3) Replace the BJ cartridge.

The carriage motor does not run.

(1) Check whether voltage is being correctly supplied to drive the motor.
(2) Check the connection from the carriage motor to the SCNT board.
(3) Check the carriage motor's resistance. 11.5 Ω/1 phase is normal. (*Fig. 3-16*)
(4) Replace the carriage motor.
(5) Replace the SCNT board.

The trailer and carriage cannot be detached/attached properly.

(1) Check for any deformation or damage of the clamp arm.
(2) Check for any lack of grease on the printer parts.
(3) Replace the trailer assembly and carriage assembly.

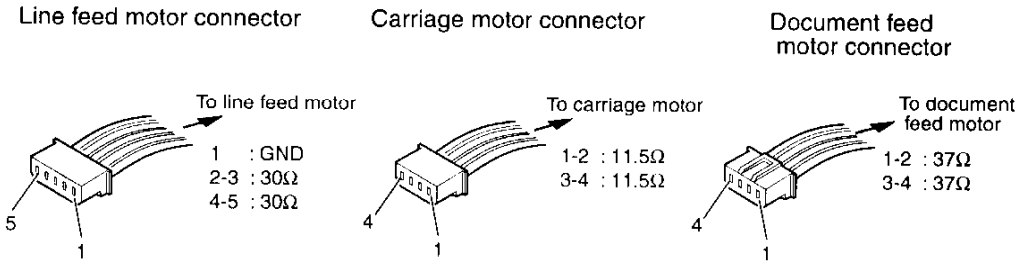


Figure 3-16 Line Feed Motor/Carriage Motor/Document Feed Motor Connector

- **Printing quality error (Evaluation criteria: Check the test print image's faults.)**
  - **Print is not clear**

    (1) Paper has a correct side for printing. If the print quality is not as clear as you would like it to be, try turning the paper over and printing on the other side.

  - **Blurred or smudged characters**

    (1) If the printed characters are blurred or smudged, make sure you are using the recommended paper.

  - **Smudges appear on back of printed page**

    (1) If ink happens to get on the printer's platen, the back side of the printed page will have smudge marks. If this occurs, clean the platen by feeding a few sheets of paper through the printer.

  - **Irregular print quality**

    (1) If white streaks appear on the printed page or dots are missing in the printed output, clean the BJ head. The printer automatically cleans the BJ head when you follow these steps:
    Press the *FUNCTION* button and *CLEANING* button in that order.

  - **Print head needs cleaning**

    (1) Paper dust or ink may get clogged in an ink nozzle in the BJ cartridge. Performing the BJ head cleaning procedure should clear up this problem.
    The printer automatically cleans the BJ head when you follow these steps:
    Press the *FUNCTION* button and *CLEANING* button in that order.

  - **Horizontal white stripes appear on some entirely black parts of the print**

    (1) Carry out nozzle cleaning on the BJ cartridge five times with the *CLEANING* button, then visually check the test print for non-discharge of ink from nozzles. (*Fig. 3-17*)
    (2) Remove and reinstall the BJ cartridge.
    (3) Replace the BJ cartridge.
    (4) Check the connection of the carriage ribbon cable and the SCNT board (JHEAD1).
    (5) Replace the carriage ribbon cable.
    (6) Replace the SCNT board.

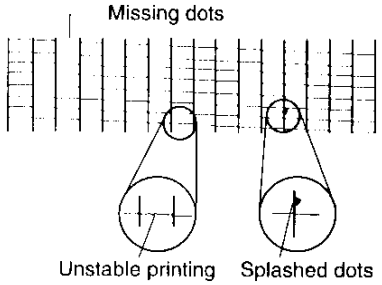


Figure 3-17 Defective Pattern (Sample)

4.3.3 Scanning problem

- **Faulty scanning (Evaluation criteria: Test print is good, but the copied image is no good.)**
  - **The document is not fed.**

The document feed motor does not run. (Evaluation criteria: Check it visually.)

(1) Check the connection from the document feed motor to the SCNT board (JRMOT1).
(2) Check the document feed motor's resistance. 37 Ω/1 phase is normal. (*Fig. 3-16*)
(3) Replace the document feed motor.
(4) Replace the SCNT board.

The document slips against the rollers. (Evaluation criteria: Check it visually. Stretched copy image.)

(1) See *page 3-4* and clean the document reading section.
(2) Replace the reading section's rollers.

The document does not separate. (Evaluation criteria: Check it visually.)

(1) Check whether the reading motor is driving all the rollers. (Check for any damaged gears or foreign matter stuck inside.)
(2) See *page 3-4* and clean the separation roller and separation guide.
(3) Replace the separation roller and separation guide.

Faulty scanner unit's sensors (Evaluation criteria: The placed document or transported document is not detected.)

(1) Check for any faulty sensors while executing the copying operation and test mode.
(2) Check the connection from the DS to the OPCNT board (J3).
(3) Check the connection from each sensor to the SCNT board. [SCNT board, Document Sensor (JOPCNT1), Document Edge Sensor (JDES1)]
(4) Replace faulty sensors.
(5) Replace the SCNT board.

- **The reading image is abnormal. (Evaluation criteria: Check the copy image's faults.)**

Nothing is printed.

(1) Check the connection between the contact sensor and SCNT board (JCS1).
(2) Replace the contact sensor assembly.
(3) Replace the SCNT board.

The image has vertical stripes.

(1) Clean the contact sensor's reading glass.
(2) Check the connection between the contact sensor and SCNT board (JCS1).
(3) Replace the contact sensor assembly.

The image has thick vertical stripes.

(1) Clean the contact sensor's reading glass.
(2) Make sure the document is not slanted.
(3) Check the connection between the contact sensor and SCNT board (JCS1).
(4) Replace the contact sensor assembly.

The halftone image contains black dots.

(1) Clean the contact sensor's reading glass.
(2) Check the connection between the contact sensor and SCNT board (JCS1).
(3) Re-enter the contact sensor's shading data. See *Page 3-6*.
(4) Replace the contact sensor.
(5) Replace the SCNT board.

5. SERVICE SOFT SWITCHES

5.1 Hardware Switches

There is only one service hardware switch on the SCNT board.

5.1.1 Model select switch

The SCNT boards for the MultiPASS C2500 and CFX-B380IF have the same part number. When the machine is powered ON, the software checks the status of this switch, and makes adjustments appropriate to the model. Therefore, when the SCNT board is replaced the switch must be set to match the model.

The illustration below describes the method of setting the switch.

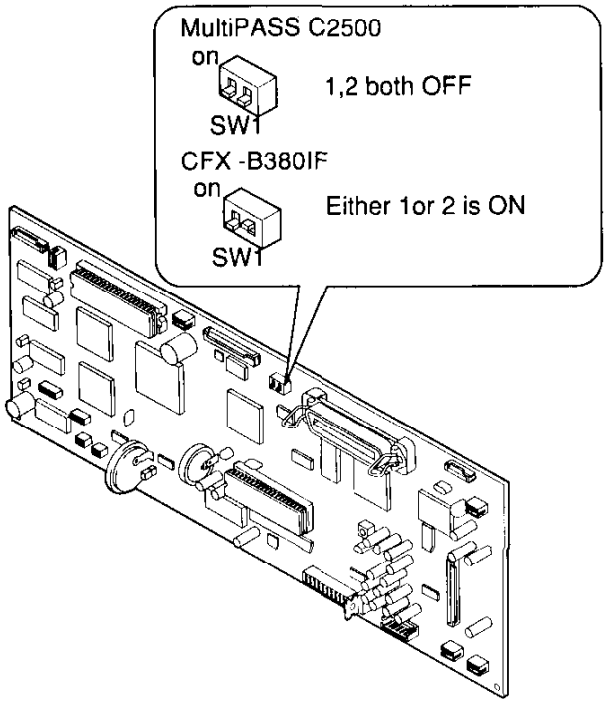


Figure 3-18 Model Select Switch

NOTE

This switch must be set to match the model. If the switch is set wrongly, the machine will be out of spec., and will operate differently to what is described in *the User's guide*, etc., possibility giving rise to complaints from customers. Also, when connecting to the PC, the software, hardware and model name (device ID) will not match, and MultiPASS software will be disabled.

5.2 Service Data Setting

Service data can be checked and changed with items on display menus. The default values of the SSSW/parameters available in this fax machine are shown in *this Chapter, 5.2.3 Service data setting* in this manual. The SSSW/parameters given in the previous product-specific manual are explained in the *G3 Facsimile Service Data Handbook*. The new switches for this model are described in *this Chapter, 5.2.3 Service data setting*.

5.2.1 Service data overview

The service data menu items are divided into the following nine blocks.

#1 SSSW (Service Soft Switch settings)

These setting items are for basic fax service functions such as error management, echo countermeasures, and communication trouble countermeasures.

#2 MENU (MENU switch settings)

These setting items are for functions required during installation, such as NL equalizer and transmission levels.

#3 NUMERIC Param. (NUMERIC parameter settings)

These setting items are for inputting numeric parameters such as the various conditions for the FAX/TEL switching function.

#4 NCU (NCU settings)

These setting items are for telephone network control functions such as the selection signal transmission conditions and the detection conditions, for the control signals sent from the exchange.

#5 TYPE (TYPE setting)

The type setting makes the service data conform to a specific country communications standards. There is only one setting item in this block.

#6 GENESIS (UHQ function setting)

These setting items are for scanned image processing such as edge enhancement and error diffusion processing.

#7 PRINTER (PRINTER function settings)

These setting items are for basic printer service functions such as the reception picture reduction conditions. Also there is an item for resetting the printer section without switching the power off-on.

#8 CLEAR (data initialization mode)

Various data are initialized by selecting one of these setting items. There is a setting item for checking/inputting the total number of pages printed and total number of pages scanned by this fax.

#9 ROM (ROM management)

ROM data such as the version number and checksum are displayed.

5.2.2 Service data registration/setting method

Service data can be registered/set by the following operations:

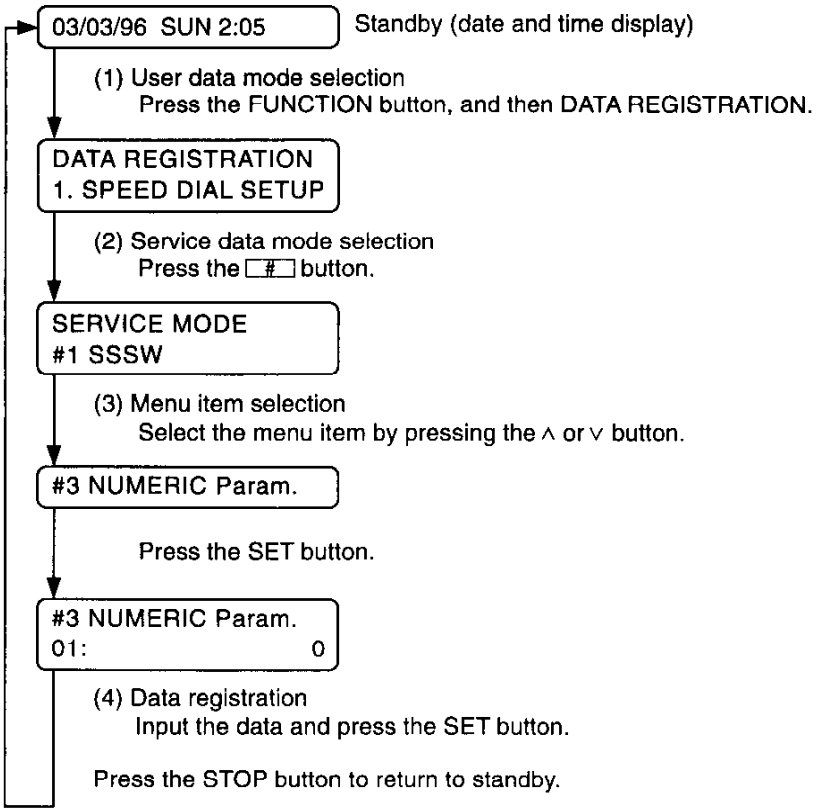

03/03/96 SUN 2:05
Standby (date and time display)
(1) User data mode selection
Press the FUNCTION button, and then DATA REGISTRATION.
DATA REGISTRATION
1. SPEED DIAL SETUP
(2) Service data mode selection
Press the □#□ button.
SERVICE MODE
#1 SSSW
(3) Menu item selection
Select the menu item by pressing the ∧ or ∨ button.
#3 NUMERIC Param.
Press the SET button.
#3 NUMERIC Param.
01: 0
(4) Data registration
Input the data and press the SET button.
Press the STOP button to return to standby.

Figure 3-19 Service Data Setting Method

5.2.3 Service data setting

Service data

10 < ◄ ► 12 >

07 ^ ▲ ▼ 15 v

#1 SSSW
(Service soft switch setting)

Bit	7	6	5	4	3	2	1	0	
SW01	–	–	–	–	0	–	0	0	Error management
SW02	–	–	–	–	–	–	–	0	Memory clear list output setting
SW03	0	0	0	0	–	–	0	–	Echo solution setting
SW04	1	0	–	0	0	0	–	–	Communication trouble solution settings
SW05	–	–	–	0	–	–	–	–	Standard function (DIS signal) setting
SW06	–	0	0	1	–	0	–	–	Scan condition settings
SW07	0	0	–	–	–	–	–	–	Closed network function settings
SW08	0	0	0	0	0	0	0	0	Closed network ID setting
SW09	–	–	–	–	–	–	0	0	Communications result display function settings
SW10	–	–	–	–	–	–	–	–	Not used
SW11	–	–	–	–	–	–	–	–	Not used
SW12	0	–	0	0	0	0	1	0	Page timer settings
SW13	–	–	–	–	–	–	–	–	Not used
SW14	–	–	–	–	–	–	–	–	Not used
SW15	–	–	–	–	–	–	–	–	Not used
SW16	–	–	–	–	–	–	–	–	Not used
SW17	–	–	–	–	–	–	–	–	Not used
SW18	–	–	–	–	–	–	–	–	Not used
SW19	–	–	–	–	–	–	–	–	Not used
SW20	–	1	–	–	–	–	–	–	Copy function settings
SW21	–	–	–	–	–	–	–	–	Not used
SW22	–	–	–	–	–	–	–	–	Not used
SW23	–	–	–	–	–	–	–	–	Not used
SW24	–	–	–	–	–	–	–	–	Not used
SW25	–	–	–	–	–	–	0	0	Report display function settings
SW26	0	0	–	–	–	–	–	–	Transmission function settings
SW27	–	–	–	–	–	–	–	–	Not used
SW28	–	–	–	–	–	–	–	–	Not used
SW29	–	–	–	–	–	–	–	–	Not used
SW30	–	–	–	–	–	–	–	–	Not used

Figure 3-20 Service Data (page 1)

The switches marked "–" are not used. Do not change their settings.

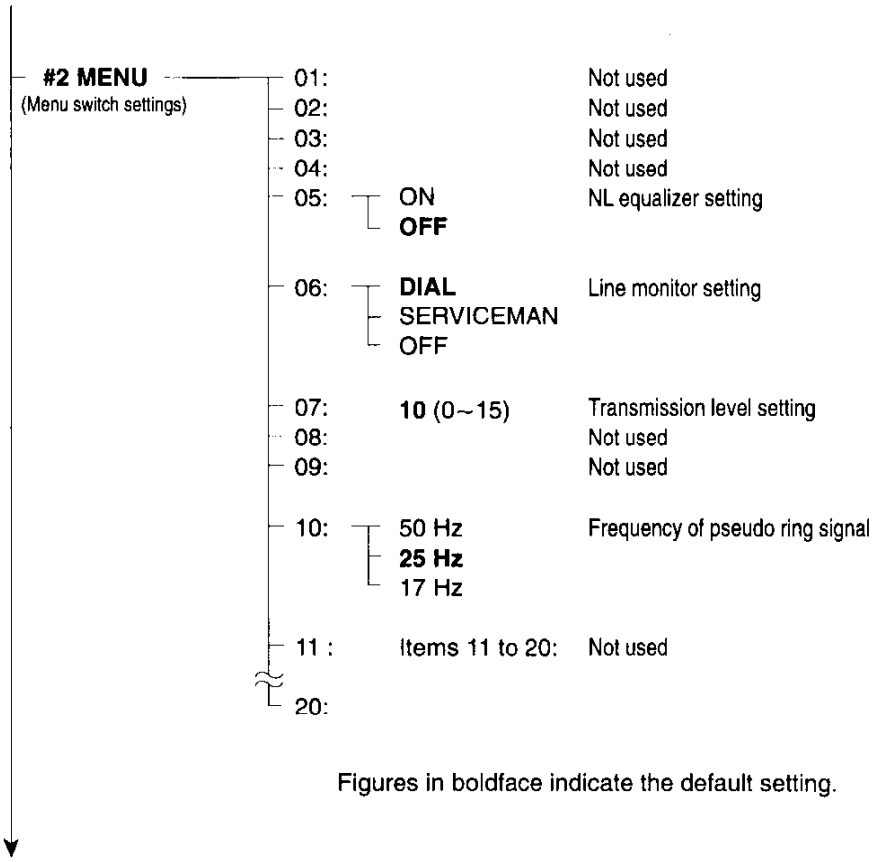


Figure 3-21 Service Data (page 2)

No. 01 to 04, 08, 09, 11 to 20 are not used. Do not change their settings.

#3 NUMERIC Param.
(Numeric parameter settings)

	Default	Range	
01:	0		Not used
02:	10 (10%)	(1~99)	RTN signal transmission condition (1)
03:	15 (15 lines)	(2~99)	RTN signal transmission condition (2)
04:	12 (12 times)	(1~99)	RTN signal transmission condition (3)
05:	0		Not used
06:	0		Not used
07:	0		Not used
08:	0		Not used
09:	6 (6 digits)	(1~20)	The number of digits in telephone number compared against TSI signal to be matched for restricted receiving function
10:	3500 (35 seconds)	(0~9999)	Line connection detection time (T1 timer)
11:	0		Not used
12:	0		Not used
13:	0		Not used
14:	0		Not used
15:	120 (1200 ms)	(0~999)	Hooking detection time
16:	4 (4 seconds)	(0~9)	Pseudo RBT transmission from CML on time until start
17:	100 (1000 ms)	(0~999)	Pseudo RBT signal pattern: On time
18:	0 (0 ms)	(0~999)	Pseudo RBT signal pattern: Off time (short)
19:	200 (4000 ms)	(0~999)	Pseudo RBT signal pattern: Off time (long)
20:	100 (1000 ms)	(0~999)	Pseudo ring pattern: On time setting
21:	0 (0ms)	(0~999)	Pseudo ring pattern: Off time (short)
22:	200 (4000 ms)	(0~999)	Pseudo ring pattern: Off time (long)
23:	7	(0~9)	FAX/TEL switching function signal detection level
24:	20	(0~20)	Pseudo-RBT signal transmission level
25:	60 (600 ms)	(0~999)	Answering machine connection function signal detection time
26:	7	(0~9)	Answering machine connection function no sound detection level
27:	0		Not used
28:	0		Not used
29:	0		Not used
30:	20		Not used

Figure 3-22 Service Data (page 3)

No. 01, 05 to 08, 11 to 14, and 27 to 30 are not used. Do not change their settings

NOTE

#3 NUMERIC PARAM. (Numeric parameter settings)

The relationship between the settings and the detection levels is as follows:

Parameter 23

0: -29 dBm	1: -33 dBm	2: -35 dBm	3: -38 dBm	4: -41 dBm
5: -44 dBm	6: -46 dBm	7: -47 dBm	8: -50 dBm	9: -50 dBm

Parameter 24

0: Not used	1: Not used	2: Not used	3: Not used	4: Not used
5: -8 dBm	6: -9 dBm	7: -10 dBm	8: -11 dBm	9: -12 dBm
10: -13 dBm	11: -14 dBm	12: -15 dBm	13: -16 dBm	14: -17 dBm
15: -18 dBm	16: -19 dBm	17: -20 dBm	18: -21 dBm	19: -22 dBm
20: -23 dBm				

Parameter 26

0: -30 dBm	1: -34.5 dBm	2: -36.5 dBm	3: -40 dBm	4: -42 dBm
5: -46 dBm	6: -48 dBm	7: -50 dBm	8: -51 dBm	9: -54 dBm

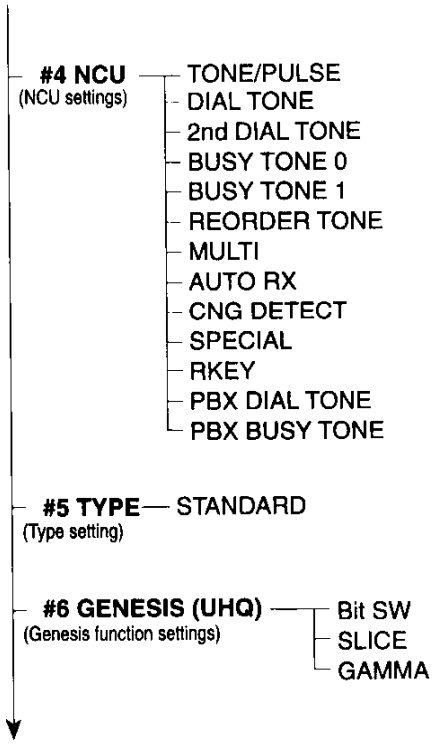


Figure 3-23 Service Data (page 4)

#4 NCU (NCU settings)

The values of these items are all set to match a specific nation's communications standards by the #5 TYPE setting. Do not change these settings.

#6 GENESIS (UHQ function settings)

Tampering with this setting may cause the scanned image quality to deteriorate.

Do not change these settings.

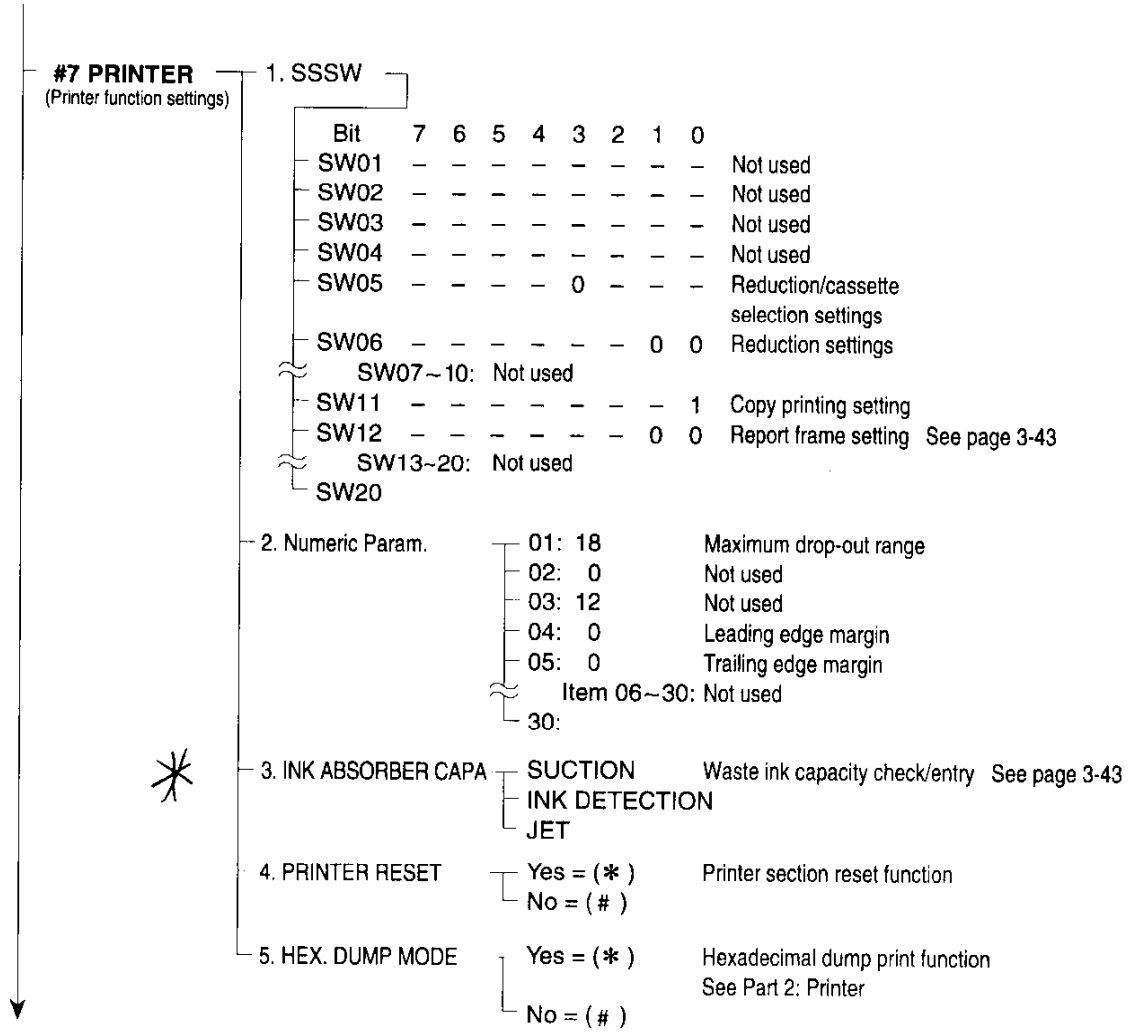

#7 PRINTER
(Printer function settings)
1. SSSW
Bit 7 6 5 4 3 2 1 0
SW01 – – – – – – – – Not used
SW02 – – – – – – – – Not used
SW03 – – – – – – – – Not used
SW04 – – – – – – – – Not used
SW05 – – – – 0 – – – Reduction/cassette selection settings
SW06 – – – – – – 0 0 Reduction settings
SW07~10: Not used
SW11 – – – – – – – 1 Copy printing setting
SW12 – – – – – – 0 0 Report frame setting See page 3-43
SW13~20: Not used
SW20
2. Numeric Param.
01: 18 Maximum drop-out range
02: 0 Not used
03: 12 Not used
04: 0 Leading edge margin
05: 0 Trailing edge margin
Item 06~30: Not used
30:
3. INK ABSORBER CAPA
SUCTION Waste ink capacity check/entry See page 3-43
INK DETECTION
JET
4. PRINTER RESET
Yes = (*)
No = (#)
Printer section reset function
5. HEX. DUMP MODE
Yes = (*)
No = (#)
Hexadecimal dump print function
See Part 2: Printer

Figure 3-24 Service Data (page 5)

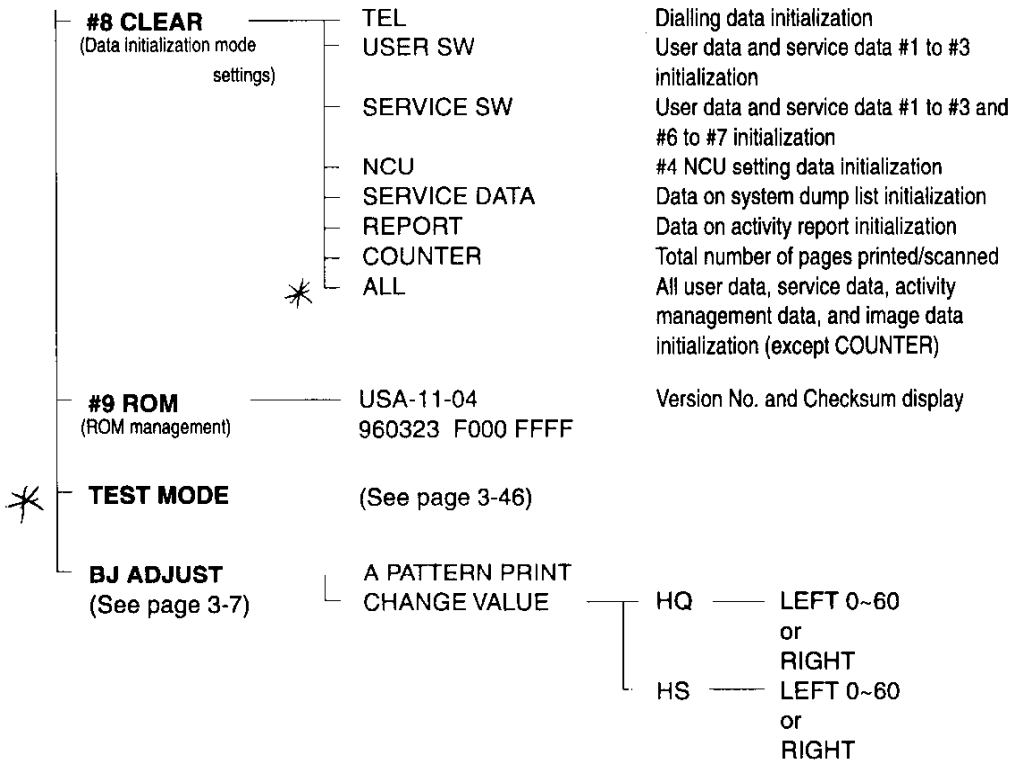
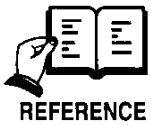


Figure 3-25 Service Data (page 6)

NOTE

If USER SW is selected from #8 CLEAR, the memory management of the user data is not cleared. If TEL or SERVICE SW is selected, the memory management of the user data is cleared.



REFERENCE

For details on test mode, see *6.2 Service Test Functions on page 3-46.*

5.2.4 Explanation of service data

a) SSSW (Service Soft Switch settings)

The items registered and set by each of these switches comprise 8-bit switches. The figure below shows which numbers are assigned to which bits. Each bit has a value of either 0 or 1.

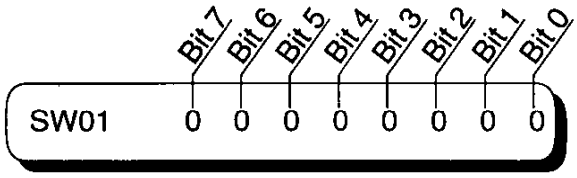
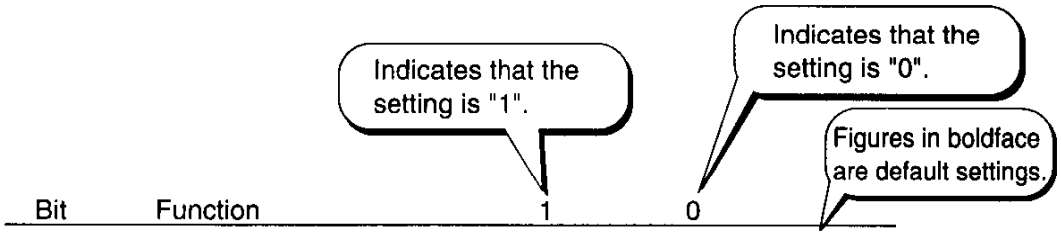


Figure 3-26 Bit Switch Display

See the chart in the service data shown in *this Chapter, 5.2.3 Service data setting* to see effective bits and their default values. The meanings (functions) of the bits are not described in this manual except the new switches added to this model. See *the G3 Facsimile Service Data Handbook* (supplied separately) for details of the switches.
Below are examples showing how to read bit switch tables.



Bit	Function	1	0
0	Service error code	Output	**Not Output**
1	Error dump list	Output	**Not Output**
2	Not used		
3	Copy function	No	**Yes**
4	Not used		
5	Not used		
6	Not used		
7	Not used		

Figure 3-27 How to Read Bit Switch Tables

5.2.5 New SSSW's/parameters added to this model

#7 PRINTER (printer function settings)

1. SSSW

SW12 (Switch 12: Report frame setting)

Bit	Function	1	0
0	Report frame lines	OFF	**ON**
1	Report frame line types	Dashed line	**Solid line**
2	Not used		
3	Not used		
4	Not used		
5	Not used		
6	Not used		
7	Not used		

[Bit 0]

Select whether to draw a frame for printing a report or list.

[Bit 1]

If a frame is drawn for printing a report or list, either a solid line or a dashed line can be selected.

3. INK ABSORBER CAPA

This switch allows the waste ink capacity stored in the SCNT board to be checked or entered.

[SUCTION]

This allows the waste ink capacity for the ink absorbed during cleaning to be checked or entered.

When entering the waste ink capacity, use the numeric buttons to enter a value 0 to 100 (%).

[INK DETECTION]

This allows the waste ink capacity for the ink discharged during the ink level detection to be checked or entered.

When entering the waste ink capacity, use the numeric buttons to enter a value 0 to 100 (%).

[JET]

This allows the waste ink capacity for the ink discharged during the maintenance jet operation for cleaning to be checked or entered. When entering the waste ink capacity, use the numeric keys to enter a value 0 to 100 (%).

NOTE

Each ink absorber's absorption capacity for the waste ink discharged by the BJ cartridge is set to a certain amount. The waste ink capacity settings are stored in the SCNT board's EEPROM. When replacing the SCNT board, check the waste ink capacity and enter the waste ink capacity into the new SCNT board.

The various waste ink capacities can be checked with the SYSTEM DUMP LIST.

6. TEST FUNCTIONS

6.1 User Test Print Functions

User enabled Test print functions are as follow.

6.1.1 Demo pattern (MultiPASS C2500 only) FONCTION *

Test prints out a demonstration pattern. When a BC-21 cartridge is used, the pattern is printed out in color.

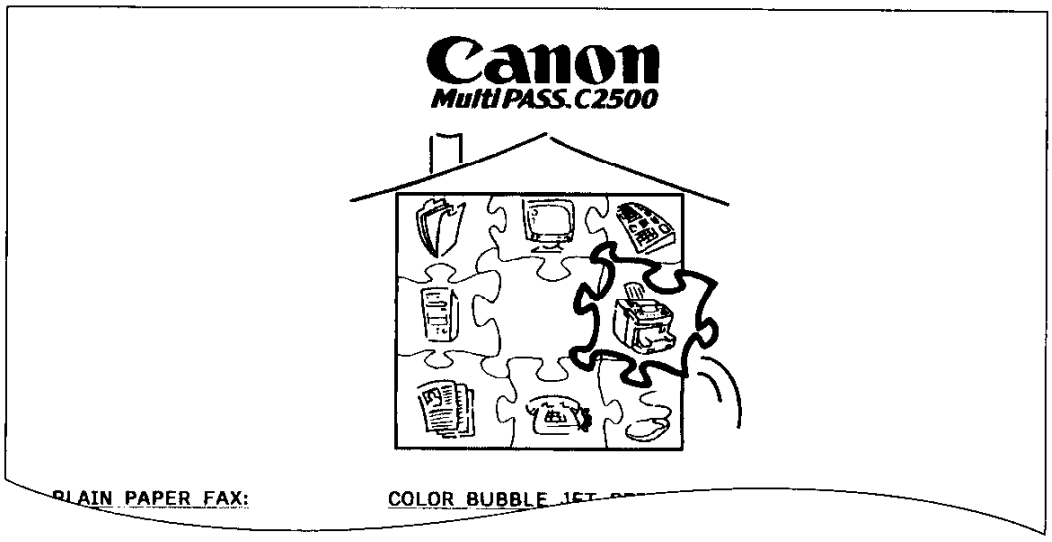


Figure 3-28 Demo Pattern

6.1.2 Printer settings

This prints the current settings of the emulation mode.

```
                LQ Mode INFORMATION of FUNCTION      Ver 1.01

English
   1.   Horizontal Print Position                    6.4mm(0.25")
   2.   Top Margin                                   8.5mm
   3.   Text Scale Mode                             Disable
   4.   Smoothing                                   Disable
   5.   Type Face                                   Roman
   6.   Font Lock                                   Disable
   7.   Input/Download Buffer                       32KB/0KB
   8.   Automatic Line Feed                         CR=CR
   9.   International Character Set                 U.S.A.
  10.   Character Set                               Graphics
  11.   Code Page                                   437
  12.   Automatic Emulation Switching               Disable
-------------------------------------------------------------------------------
French
   1.   Position d'impression Horizontale           6.4mm(0.25")
   2.   Marge Supérieure                            8.5mm
   3.   Mode Text Scale                             Désactivé
   4.   Lissage
        de Caractères
```

Figure 3-29 Printer Settings Pattern

6.1.3 All characters

The printer control mode, printer control ROM version, and function settings in the header section are printed out as shown below. The same patterns are printed for color BJ cartridge and black cartridge.

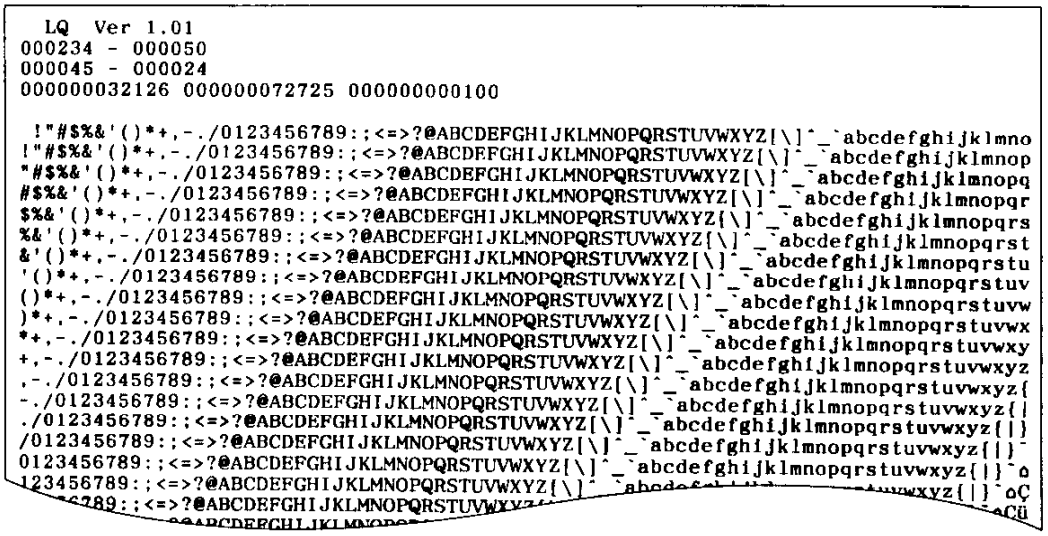


Figure 3-30 All Characters Pattern

6.1.4 Nozzle check

Execute cleaning if this test printing shows each nozzle condition such as no ejection, unclear or unstable etc. If the printing does not improve even after the cartridge is cleaned five times, replace the BJ cartridge or the ink cartridge.

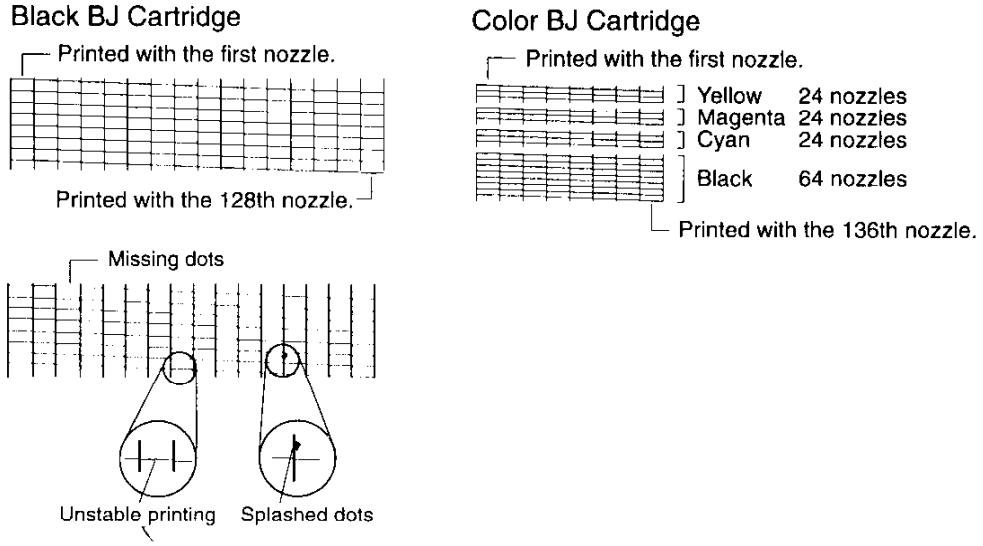


Figure 3-31 Nozzle Check Pattern

6.2 Service Test Functions

The fax functions for testing individual operations, such as below.
See *Page 3-41* for details of entering the test mode. To leave the test mode, press the *CLEAR* button.

6.2.1 Test mode overview

Test mode can be executed by following the menu items from the display.

a) DRAM tests

Writes data to DRAM image storage areas and reads that data to check operations.

b) CS test

CS test is used to enter the contact sensor's shading data.

c) Print test

Prints nine different patterns within the print area.

d) Modem, NCU tests

The frequency test and the G3 signal transmission and CNG signal and DTMF signals reception tests.

e) Faculty tests

Test the operation of operation panel and sensor functions.

6.2.2 Test mode flowchart

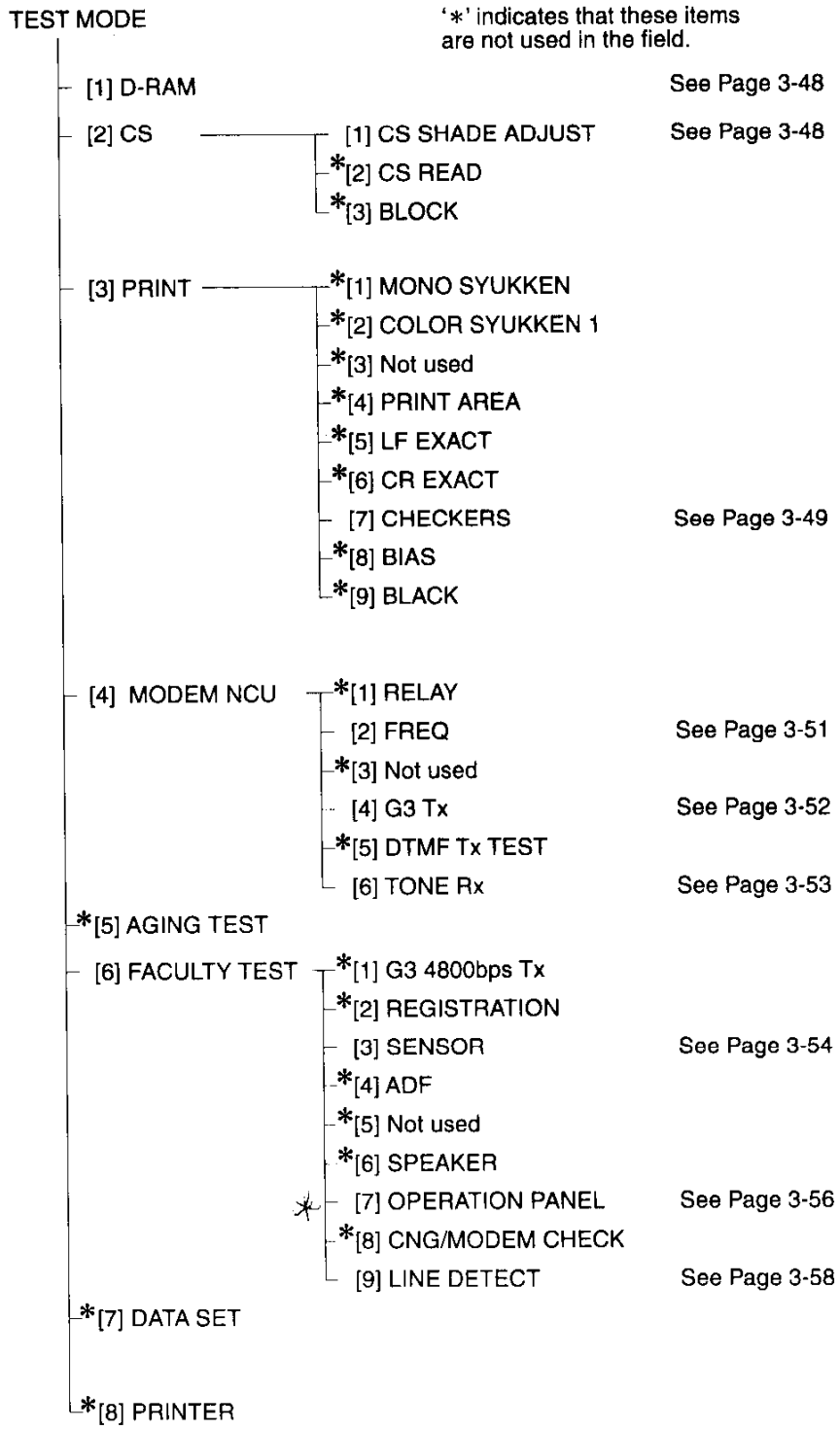


Figure 3-32 Test Mode

6.2.3 D-RAM tests

Pressing the *1* button from the test mode menu selects the D-RAM tests. D-RAM Test 1 writes data to the entire D-RAM region and reads it out to check that operations are correct. D-RAM Test 2 just reads data at high speed. This test can be used to check operations when optional memory has been added.

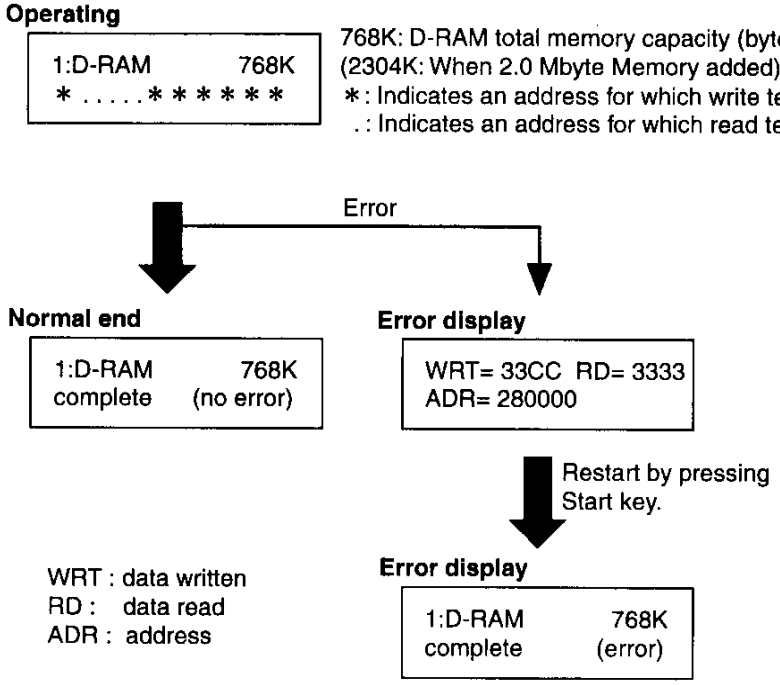


Figure 3-33 D-RAM Test

6.2.4 CS tests

Pressing the *1* button from the test mode menu selects the CS tests. CS SHADE ADJUST is used to enter the contact sensor's shading data.

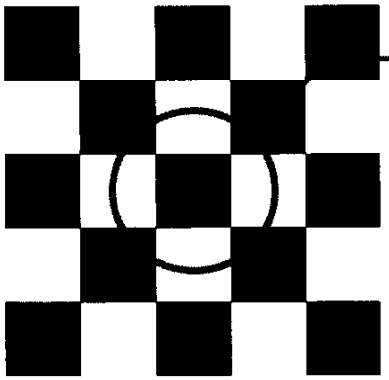
REFERENCE

Details on CS SHADE ADJUST, see *3.1 Shading Data Adjustment on page 3-6.*
Tests [2] and [3] are not used in the field.

6.2.5 PRINT test

Pressing the *3* button from the test mode menu selects the print test. This test prints various patterns. For servicing, use the 3-7: CHECKERS pattern (press the *7* button from the print test menu). The other patterns are not to be used since they are for development and factory personnel.

Check the pattern for the following:



Check for any vertical or horizontal white stripes on the black squares.
Also, check that all the squares have straight edges on all four sides.

Figure 3-34 Print Test Pattern Check

NOTE

If the print test is normal, make a copy of a document. If the copy is faulty, the reading section is faulty.

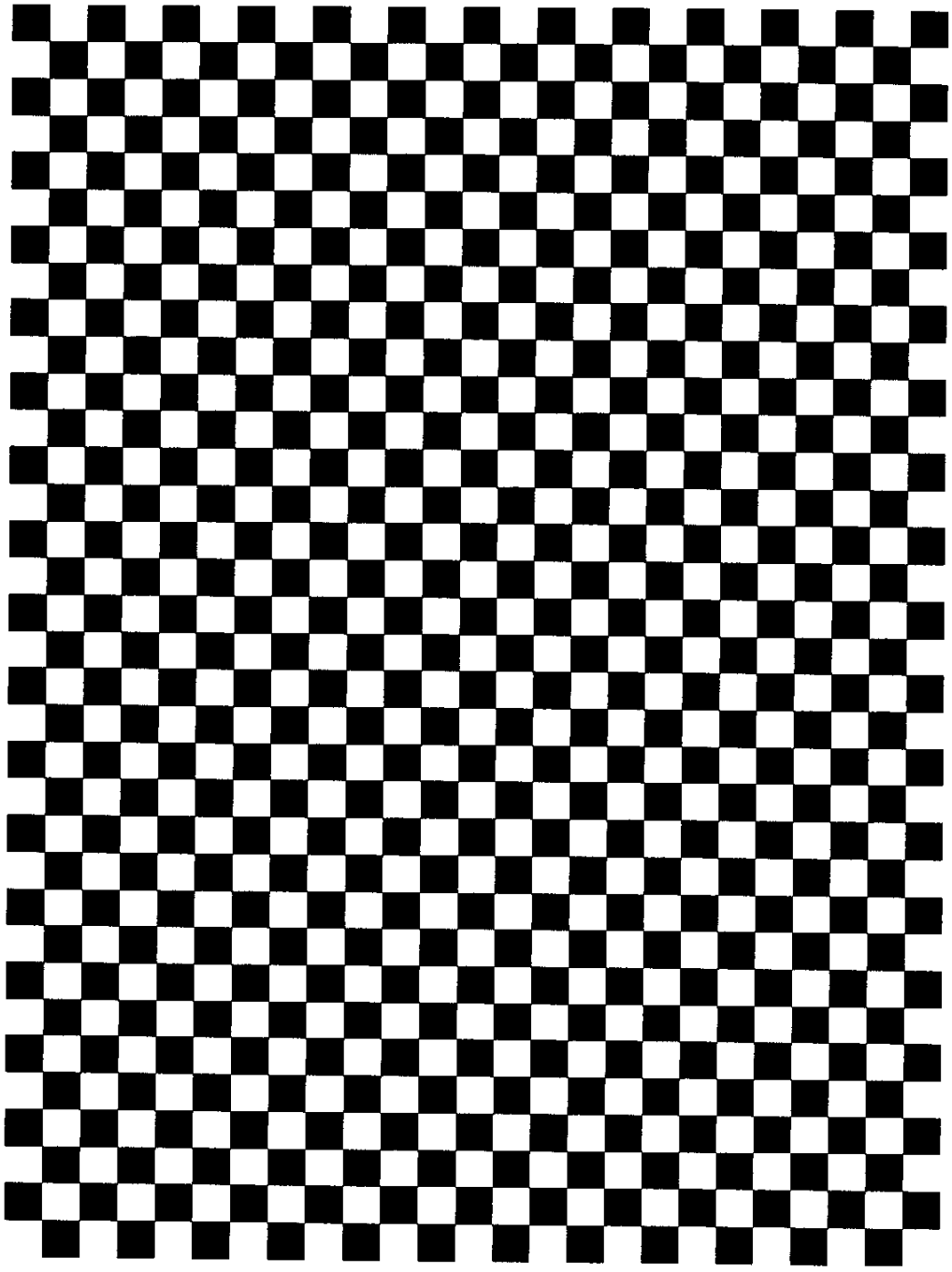


Figure 3-35 Print Pattern Sample

6.2.6 Modem and NCU tests

These tests test modem and NCU transmission and reception. The modem tests check whether signals are sent correctly from the modem by comparing the sound of the signals from the speaker with the sounds from a normal modem. Also, you check on the display whether or not the modem correctly detected received tone signals and DTMF signals.
End this test by pressing the *STOP* button.

Modem test type	Overview
Frequency test	The modem sends tone signals from the modular jack and the speaker.
G3 signal transmission test	The modem sends G3 signals from the modular jack and the speaker.
Tonal signal reception tests	The modem detects specific frequencies and DTMF signals received from the modular jack.

a) Frequency test

The frequency test menu is selected by pressing the *2* button from the MODEM NCU test menu. Signals of the frequencies below are sent from the modem using the modular jack and the speaker. The frequency can be changed with the numeric buttons.

Numeric button	Frequency
0	Pseudo-RBT
1	462 Hz
2	1100 Hz
3	1300 Hz
4	1500 Hz
5	1650 Hz
6	1850 Hz
7	2100 Hz

NOTE

The pseudo-ringback tone transmission pattern and frequency and the output levels for each frequency follow the service data transmission level settings.

b) G3 signal transmission test

The G3 signal transmission test menu is selected by pressing the *4* button from the MODEM NCU test menu. The G3 signals below are sent from the modem using the modular jack and the speaker. The frequency can be changed with the numeric buttons.

Numeric button	Frequency
0	300 bps
1	2400 bps
2	4800 bps
3	7200 bps
4	9600 bps
5	TC7200 bps
6	TC9600 bps
7	12000 bps
8	14400 bps

NOTE

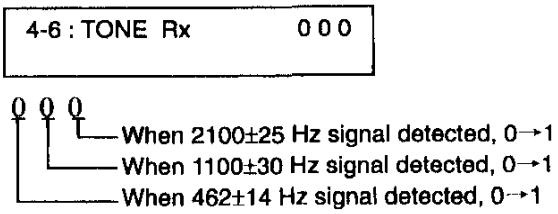
The transmission level for each frequency follows the service data.

c) Tonal and DTMF signal reception tests

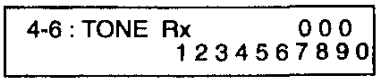
The tonal and DTMF signal reception test is selected by pressing the *6* button from the MODEM NCU test menu. In these tests, you can check whether the tonal signals and DTMF signals received from the modular jack are detected by the modem.

The 462 ±14 Hz test is included because the modem has a 462±14 Hz detection function.

Tonal signal reception test



DTMF signal reception test



The received DTMF signals are displayed in order from the right on the second line of the display.

Figure 3-36 Tonal and DTMF Signal Reception Tests

The 462-Hz tonal signal detected in the tonal signal reception test is the G2 standard PIS signal. This fax's modem has a function for detecting that signal.

6.2.7 Faculty tests

The faculty tests are selected by pressing the *6* button from the test mode menu. These tests test the following faculties of this fax.

Test type	Overview
Sensor tests	Test whether the sensors are operating correctly.
Operation panel test	Tests whether the button switches on the control panel are operating correctly.
Line signal reception test	Tests whether the NCU board signal sensor and frequency counter are operating correctly.

a) Sensor tests

The sensor test is selected by pressing the *3* button from the faculty test menu. In this test, you can check the status of each sensor of this fax in items 1-2 on the display.
You can also check if sensors that use actuators and microswitches are operating correctly by moving the actuator or microswitch.

NOTE

The sensor tests cannot be used to test all of the sensors. The following sensors cannot be tested with the sensor tests:

Home position sensor, paper edge sensor, and ink detection sensor.
If any of these sensor are faulty, an error message or service error code will appear to indicate the faulty sensor.

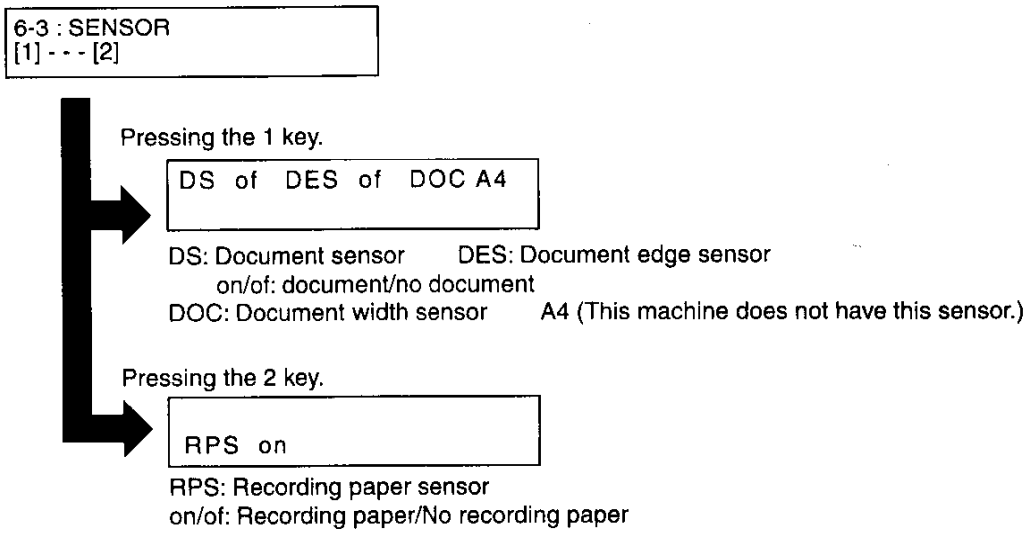

6-3 : SENSOR
[1] - - - [2]
Pressing the 1 key.
DS of DES of DOC A4
DS: Document sensor DES: Document edge sensor
on/of: document/no document
DOC: Document width sensor A4 (This machine does not have this sensor.)
Pressing the 2 key.
RPS on
RPS: Recording paper sensor
on/of: Recording paper/No recording paper

Figure 3-37 Sensor Tests

b) Operation panel tests

The operation panel test is selected by pressing the *7* button from the faculty test menu. In this test, check that the display, LED lamps, and buttons on the control panel are operating correctly.

b-1) Display test

Pressing the *START/COPY* button from the control panel menu, "H" is displayed 20 characters by 2 lines on the display. The next time the *START/COPY* button is pressed, all the LCD dots on the display are displayed. Check for any LCD dots in the display that are not displayed.

b-2) LED lamp test

The LED lamp test is selected by pressing the *START/COPY* button after the display test.

When the *START/COPY* button is pressed, all the lamps on the control panel light. Check for any LED that does not light during the test.

b-3) Operation button test

The Operation button test is selected by pressing the *START/COPY* button after the LED lamp test.

In this test, you press the button corresponding to the displayed character to put it out. The table giving the correspondence between the characters and the buttons is below.

Character	Operation button	Character	Operation button
1-#	Numeric buttons	$	Fine-Standard button
P	Pause button	&	Ans hook up-Manual button
R	Redial button	F	Function button
O	Hook button	Z	Set button
D	Coded dial button	V	Cartridge button
Y	Printer button	B	Resume button

When all the characters displayed have gone out, the system next starts the one-touch speed dialing button test. The letters a-p are displayed on the display, corresponding to one-touch speed dialing buttons 01-16. Each letter displayed on the display goes out when its corresponding one-touch speed dialing button is pressed.

In this test, check for operation buttons whose corresponding character or letter does not go out when the button is pressed.

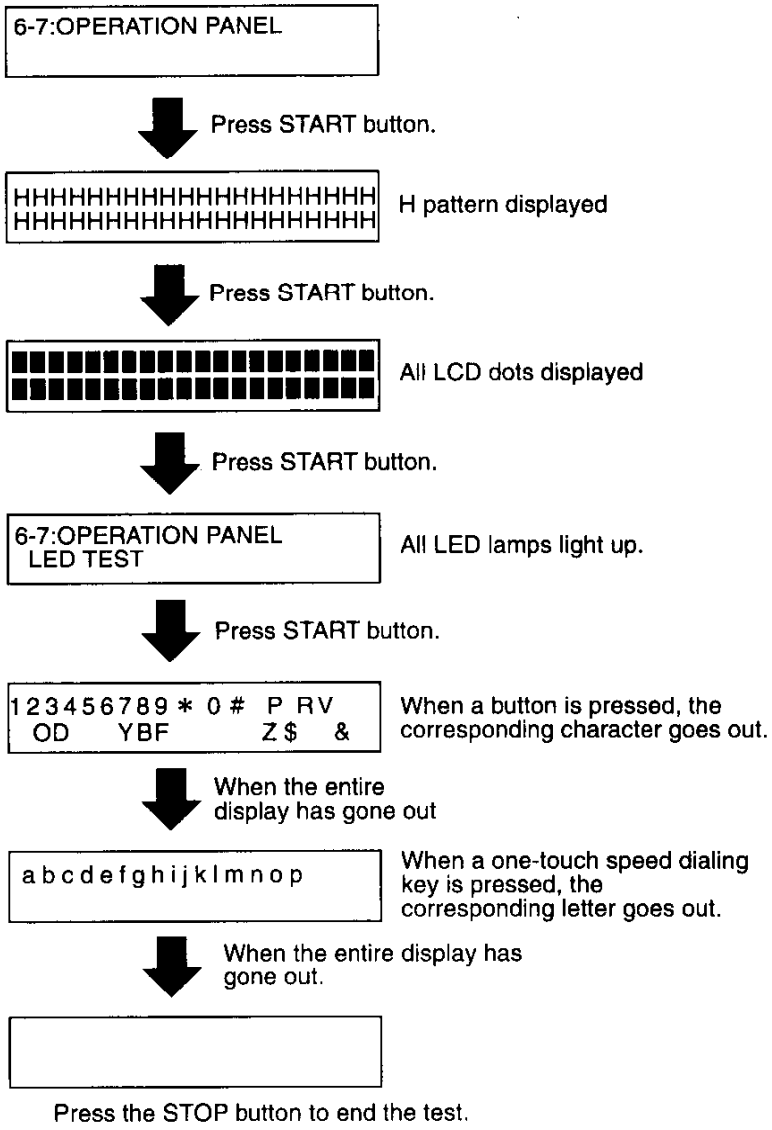

6-7:OPERATION PANEL
Press START button.
HHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHH
H pattern displayed
Press START button.
All LCD dots displayed
Press START button.
6-7:OPERATION PANEL
LED TEST
All LED lamps light up.
Press START button.
1 2 3 4 5 6 7 8 9 * 0 # P R V
O D Y B F Z $ &
When a button is pressed, the corresponding character goes out.
When the entire display has gone out
a b c d e f g h i j k l m n o p
When a one-touch speed dialing key is pressed, the corresponding letter goes out.
When the entire display has gone out.
Press the STOP button to end the test.

Figure 3-38 Control Panel

c) Line signal reception test

The line detect test menu is selected by pressing the *9* button from the faculty test menu. This test checks the operation of the NCU signal sensor and frequency counter. In Menu 1, the CI, and extension telephone hook status can be detected and in Menu 2 the frequency can be detected at changing detection levels. In this way, you can check if the NCU board is correctly detecting signals.

c-1) Test Menu 1

Test Menu 1 is selected by pressing the *1* button from the Line Detect menu. When CI, or the extension telephone off-hook is detected from the modular jack, the display changes from OFF to ON.

c-2) Test Menu 2

Test Menu 2 is selected by pressing the *2* button from the Line Detect menu. When a tonal frequency is detected from the modular jack, the display changes from OFF to ON and the received frequency is displayed. The frequency detection level can be set with the numeric buttons.

Numeric button	Detection level (dBm)
0	–26
1	–30
2	–32
3	–35
4	–38
5	–41
6	–43
7	–45
8	–47
9	–51

c-3) Test Menu 3

Test Menu 3 is selected by pressing the *3* button from the Line Detect menu. When CNG is detected from the modular jack, the display changes from OFF to ON.

c-4) Test Menu 4

This item is not used. Do not select it.

7. SERVICE REPORT

7.1 Report Output Function

7.1.1 User report output functions

The fax can output user reports manually by user operation, or automatically, according to user data settings.

a) Manual output of reports by user operation

Report type	Operations
One-touch dial list Coded speed dial list Group dial list	Press *FUNCTION*, *DATA REGISTRATION*, *SET*, and *REPORT* button.
User's data list	Press *FUNCTION*, *DATA REGISTRATION*, v, *SET*, and *REPORT* button.
Activity Management Reports	Press *FUNCTION*, then *REPORT* button.

b) Reports output automatically by user data settings

Each report written below can be automatically output by specifying "REPORT SETTINGS" in user data.

Transmission report
Reception report
Activity Management Reports

REFERENCE

For samples of user reports, See *the User's guide.*

NOTE

ROM Version display

The ROM version is printed on the top left hand side of the User's data list. Please refer to this when troubleshooting.

example:

USA XX-XX / X.XX
- XX-XX: MAIN ROM version
- X.XX: Printer ROM version

c) Reports output automatically

Memory clear list

The fax automatically outputs a memory clear list when the power is turned on after a power cut, and the image memory backup time (approx. one hour) has been exceeded.

04/04/96 THU 18:17 FAX 0123456789 Canon Inc. 001

****
*** MEMORY CLEAR REPORT ***
****

MEMORY FILES DELETED

TX/RX NO	MODE	CONNECTION TEL/ID	PGS.	SET TIME	ST. TIME
0013	DEL SQ BDCST	[01]Canon A	2	04/04 18:13	19:00
		[02]Canon B			19:00
0014	TRANSMIT	[* 05]Canon C	1	04/04 18:14	
5008	MEMORY RX		2	04/04 18:14	-----

Figure 3-39 Memory Clear List

TX/RX NO	: Indicates four digits of the transaction number
MODE	: Indicates, TRANSMISSION, or MEMORY RX
CONNECTION TEL	: Number sent from the other party or number dialled
PAGES	: Number of pages are stored in memory
SET TIME	: Time when data is stored in memory
START TIME	: Planned transmission start time (24-hour display)

7.1.2 Service report output functions

The fax outputs service data setting status, past communications history reports.

a) List of service reports

The fax outputs the service reports shown below.

Report type	Operations
1. System data list 2. System dump list	In the service mode, press the *REPORT* button and the desired numeric button 0 to 2. Pressing buttons 1 to 2 outputs the respective service reports on the left. When pressing button 0, both are output.
Service activity report (with service error code and dump list)	If you set bits 0 and 1 of #1 SSSW SW01 in the service mode, the service error code and dump list are indicated on the activity report (sending/receiving).

a-1) System data list

This list shows service data #1~#5, #7, #9 setting statuses.

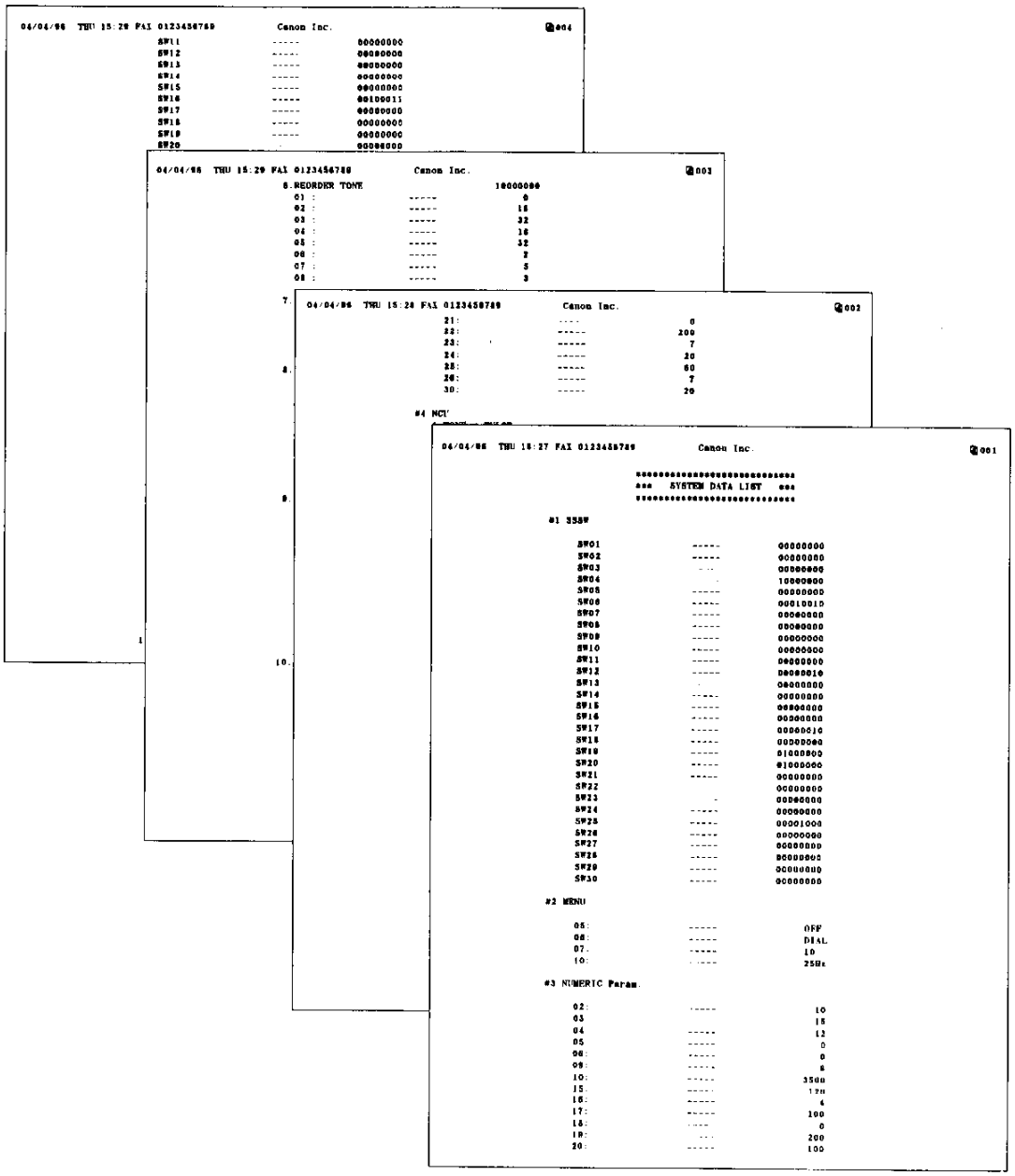


Figure 3-40 System Data List (page 1 ~ page 4)

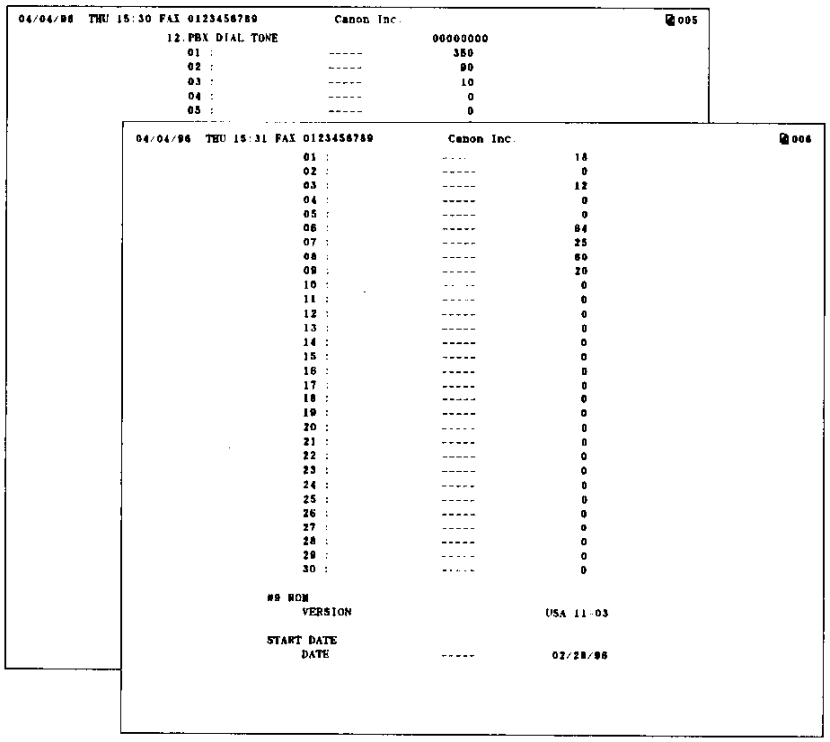
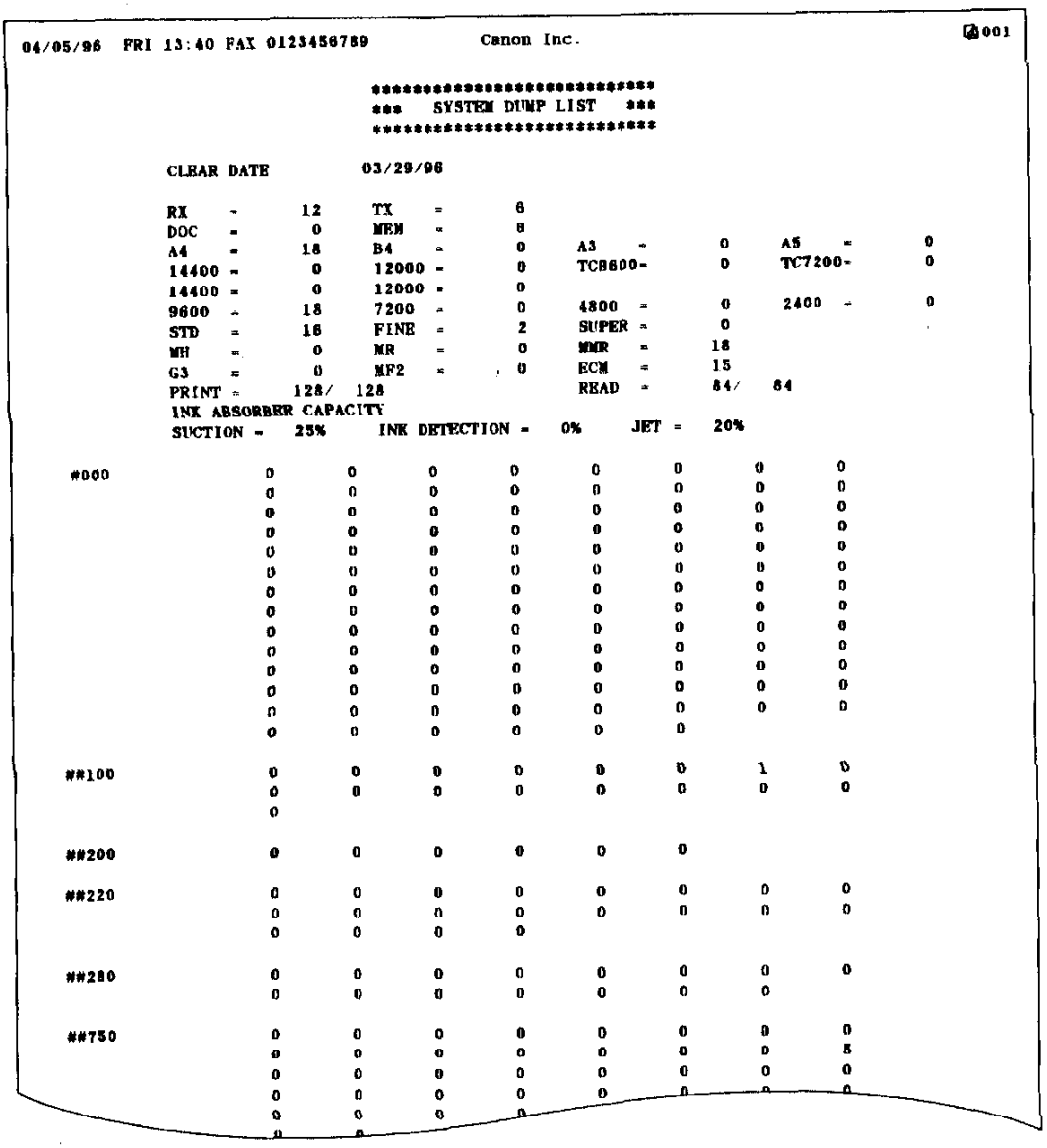


Figure 3-41 System Data List (page 5 ~ page 6)

NOTE

"START DATE" records the date when the fax performs its first operation, after shipment from the factory.

a-2) System dump list



```
04/05/98  FRI 13:40 FAX 0123456789          Canon Inc.                    001

                          ****************************
                          ***   SYSTEM DUMP LIST   ***
                          ****************************

          CLEAR DATE          03/29/98

          RX     =      12    TX     =       6
          DOC    =       0    MEM    =       6
          A4     =      18    B4     =       0    A3     =       0    A5     =       0
          14400  =       0    12000  =       0    TC8600 =       0    TC7200 =       0
          14400  =       0    12000  =       0
          9600   =      18    7200   =       0    4800   =       0    2400   =       0
          STD    =      16    FINE   =       2    SUPER  =       0
          MH     =       0    MR     =       0    MMR    =      18
          G3     =       0    MF2    =       0    ECM    =      15
          PRINT  =    128/  128                   READ   =      84/   84
          INK ABSORBER CAPACITY
          SUCTION =   25%      INK DETECTION =    0%      JET =    20%

#000      0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0

##100     0   0   0   0   0   0   1   0
          0   0   0   0   0   0   0   0
          0

##200     0   0   0   0   0   0

##220     0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0

##280     0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0

##750     0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   5
          0   0   0   0   0   0   0   0
          0   0   0   0   0   0   0   0
          0   0   0   0
          0   0
```

Figure 3-42 System Dump List (1/2)

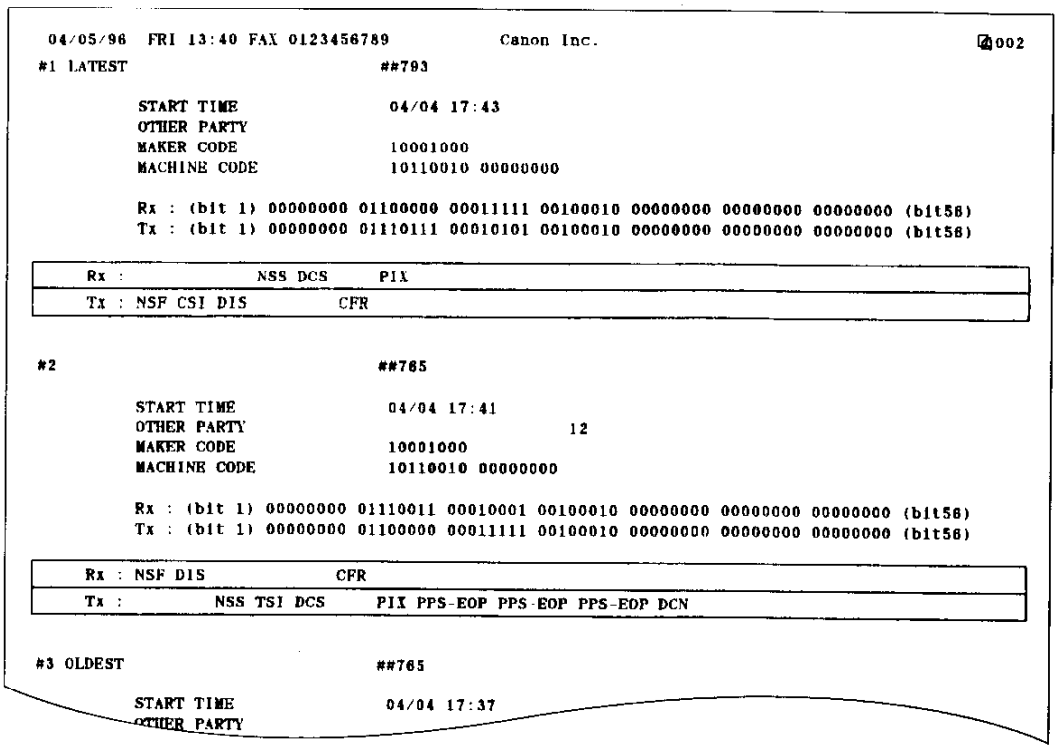
CLEAR DATE	: Date on which data was initialized with service data #8 CLEAR, ALL
RX/TX	: Total number of pages received/transmissions
DOC/MEM	: Total number of pages directly/memory transmitted
A4/B4/A3/A5	: Total number of pages transmitted and received for each document size
14400 bps~2400 bps	: Total number of pages transmitted and received for each modem speed
STD/FINE	: Total number of pages transmitted and received for each mode
MH/MR/MMR	: Total number of pages transmitted and received for each coding method
G3/MF2/ECM	: Total number of pages transmitted and received in each mode
PRINT/READ	: Total number of pages printed/scanned

[Display example]
PRINT = 30*/100** READ = 30*/100**
* Indicates the value input with Service Data #8 CLEAR, COUNTER.
** Indicates the value counted since shipment from the factory.

INK ABSORBER CAPACITY: Waste ink absorber's ink absorption amount
[Display example]
Suction = 10% Ink detection = 12% Jet = 8%
These indicate the following:
The suction waste ink absorber's ink absorption amount is 10%.
The ink detection absorber's ink absorption amount is 12%.
The maintenance jet absorber's ink absorption amount is 8%.

#000~##750
[Display example] : Total number of occurrences for each error code

##280	1	7	3	0	0
	##280 errors	##281 errors	##282 errors		



```
04/05/96  FRI 13:40 FAX 0123456789          Canon Inc.                    002
#1 LATEST                          ##793

          START TIME                04/04 17:43
          OTHER PARTY
          MAKER CODE                10001000
          MACHINE CODE              10110010 00000000

          Rx : (bit 1) 00000000 01100000 00011111 00100010 00000000 00000000 00000000 (bit56)
          Tx : (bit 1) 00000000 01110111 00010101 00100010 00000000 00000000 00000000 (bit56)

     Rx :              NSS DCS      PIX
     Tx : NSF CSI DIS           CFR

#2                                 ##765

          START TIME                04/04 17:41
          OTHER PARTY                                12
          MAKER CODE                10001000
          MACHINE CODE              10110010 00000000

          Rx : (bit 1) 00000000 01110011 00010001 00100010 00000000 00000000 00000000 (bit56)
          Tx : (bit 1) 00000000 01100000 00011111 00100010 00000000 00000000 00000000 (bit56)

     Rx : NSF DIS               CFR
     Tx :          NSS TSI DCS      PIX PPS-EOP PPS-EOP PPS-EOP DCN

#3 OLDEST                          ##765

          START TIME                04/04 17:37
          OTHER PARTY
```

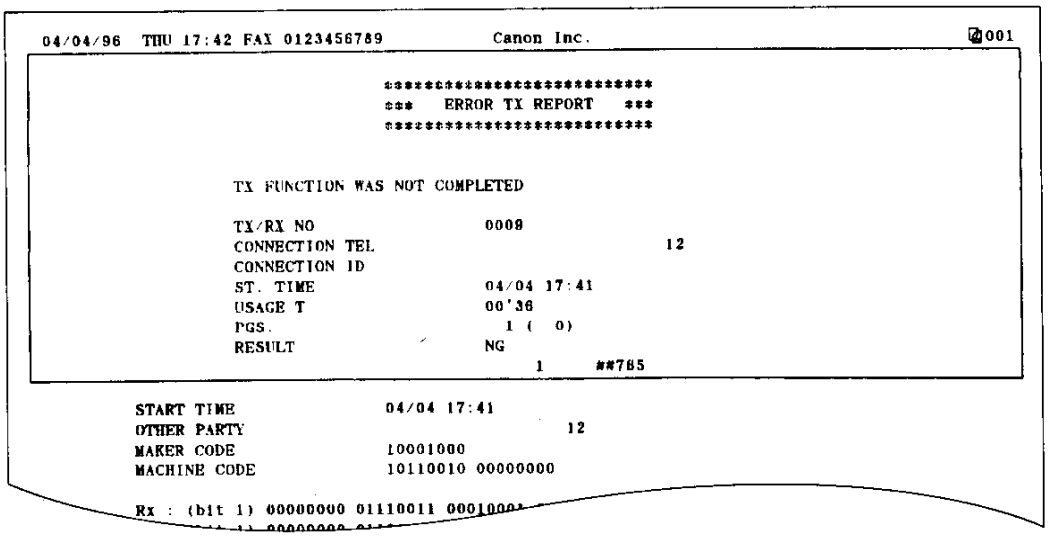
Figure 3-43 System Dump List (2/2)

##nnn	: Service error code
START TIME	: Communication start date and time (on 24 hour clock)
OTHER PARTY	: Telephone number sent from other party
MAKER CODE	: Maker code (For details, see *Chapter 4: 4. MAKER CODE on page 4-10)*
	[1000 1000] Indicates a Canon fax lower nibble upper nibble
MACHINE CODE	: For future use
RX/TX	: Received/transmitted protocol signal bit 1 to bit 56 of received/transmitted DIS, DCS, or DTS

NOTE

If no service errors have occurred in the past, the above report will not be output.

a-3) Service activity report (sending/receiving)



```
04/04/96  THU 17:42 FAX 0123456789          Canon Inc.                  001

                        ****************************
                        ***   ERROR TX REPORT    ***
                        ****************************


              TX FUNCTION WAS NOT COMPLETED

              TX/RX NO                  0009
              CONNECTION TEL                              12
              CONNECTION ID
              ST. TIME                  04/04 17:41
              USAGE T                   00'36
              PGS.                        1 (  0)
              RESULT                    NG
                                              1     ##785

        START TIME              04/04 17:41
        OTHER PARTY                             12
        MAKER CODE              10001000
        MACHINE CODE            10110010 00000000

        Rx : (bit 1) 00000000 01110011 00010001
```

Figure 3-44 Service Error Tx Report

TX/RX NO	: Indicates four digits of the transaction number
CONNECTION TEL (OTHER PARTY)	: Number sent from the other party or number dialled (lower 20 digits)
CONNECTION ID	: ID sent from the other party, if the other party is a Canon fax
START TIME	: Communication start date and time (on 24-hour display)
USAGE TIME	: Communication time (in minutes and seconds)
PAGES	: Number of pages for which transmission was complete (For details, see *User's guide*)
RESULT	: "**NG**" display with number of pages for which transmission was fault, and service error code
MAKER CODE	: Maker code (For details, see *Chapter 4: 4. MAKER CODE on page 4-10)* [1000 1000] Indicates a Canon fax └── lower nibble └── upper nibble
MACHINE CODE	: For future use
RX/TX	: Received/transmitted protocol signal bit 1 to bit 56 of received/transmitted DIS, DCS, or DTS

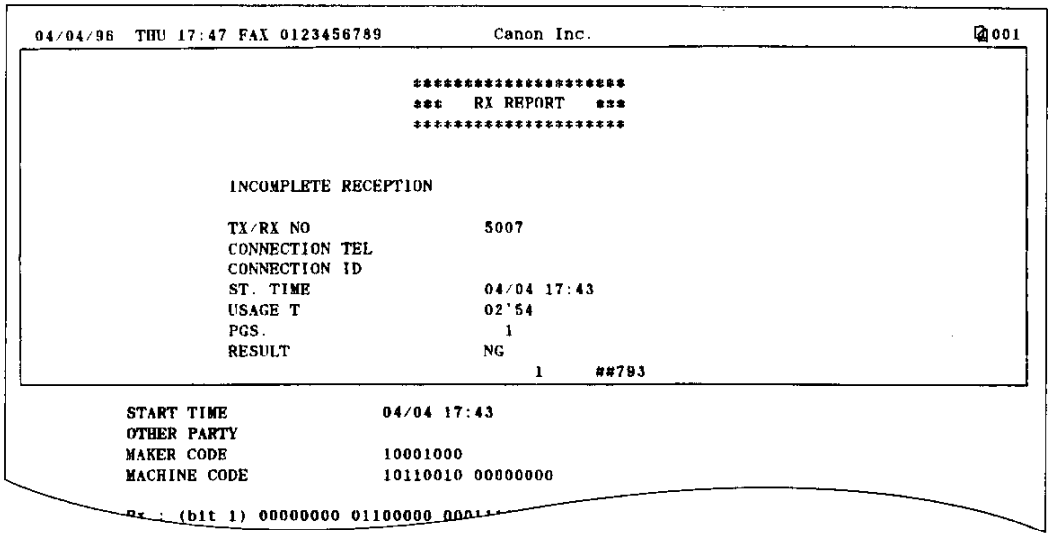


Figure 3-45 Service Error Activity Report (receiving)

TX/RX NO	: Indicates four digits of the transaction number
CONNECTION TEL (OTHER PARTY)	: Number sent from the other party or number dialled (lower 20 digits)
CONNECTION ID	: ID sent from the other party, if the other party is a Canon fax
START TIME	: Communication start time (on 24-hour display)
USAGE TIME	: Communication time (in minutes and seconds)
PAGES	: Number of pages for which receiving was complete (For details, see *User's guide*)
RESULT	: **"NG"** display with number of pages for which receiving was fault, and service error code
MAKER CODE	: Maker code (For details, see *Chapter 4: 4. MAKER CODE on page 4-10*) [1000 1000] Indicates a Canon fax — lower nibble — upper nibble
MACHINE CODE	: For future use
RX/TX	: Received/transmitted protocol signal bit 1 to bit 56 of received/transmitted DIS, DCS, or DTS

8. WIRING DIAGRAM

Refer to *"CIRCUIT DIAGRAM"* (supplied separatley) for details of the connector signals.
8.2 Connector Name and Signal Descriptions on following page, contains a brief description of the input/output signals.
Refer to this description when carrying out troubleshooting.

8.1 Wiring Diagram

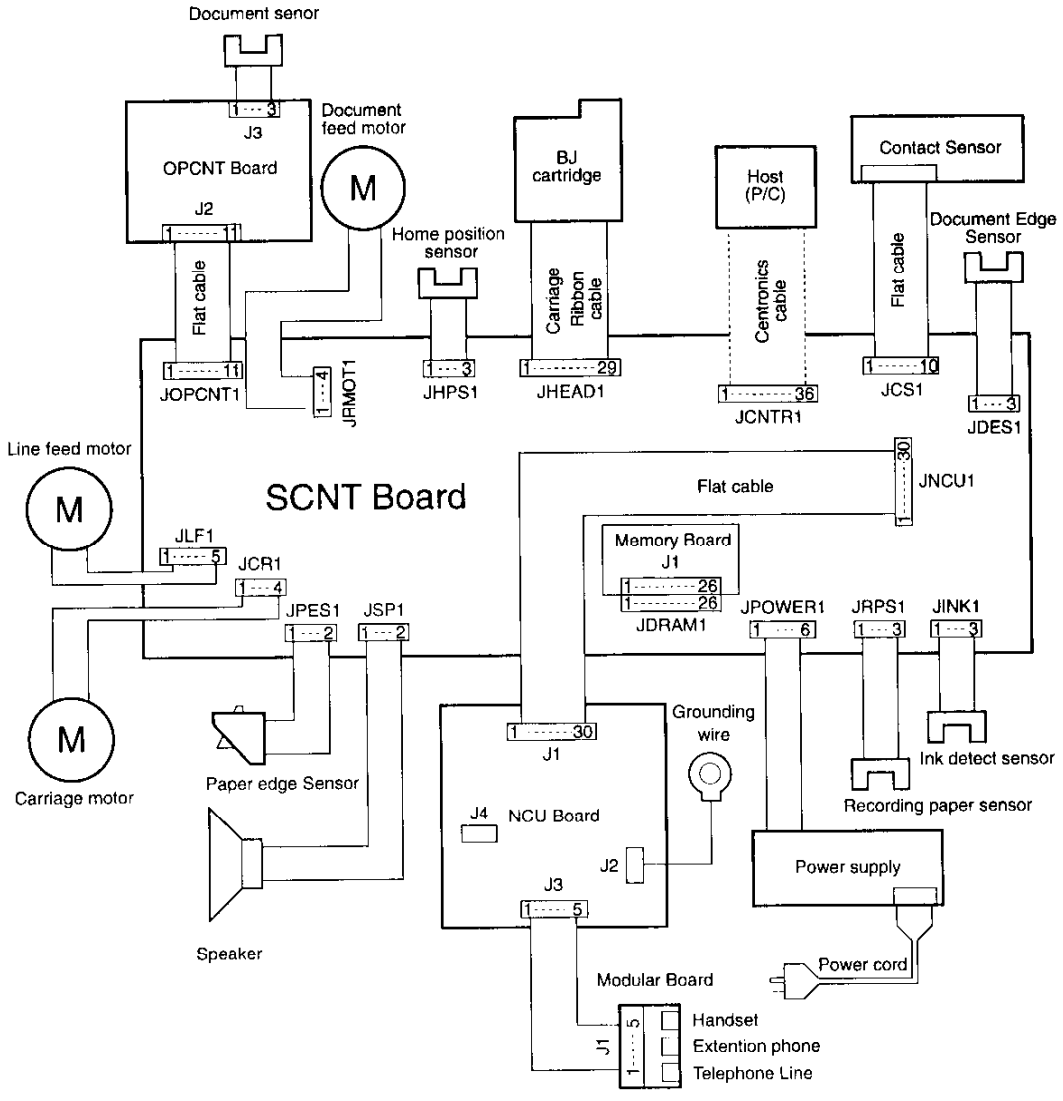


Figure 3-46 Wiring Diagram

8.2 Connector Name and Signal Descriptions

SCNT board

Connector name	Connected to	Description
JOPCNT1	OPCNT board (J2)	Connects to OPCNT board. Performs keyinput data exchange and LCD data exchange. This also includes document sensor data.
JRMOT1	Document feed motor	Provides drive voltage for the document feed motor.
JHPS1	Home position sensor	Receives detection signals from the home position sensor.
JHEAD1	BJ cartridge	Connector for BJ cartridge. In addition to exchange of print data and BJ head temperature detection signals, also includes BJ cartridge detection and type identification signals.
JCNTR1	Host (PC)	Centronics connector for parallel connection to host.
JCS1	Contact sensor	Connects between scanning section and contact sensor. Its purpose is to drive voltage for the contact sensor, and to receive image signals.
JDES1	Document edge sensor	Receives detection signals from the Document edge sensor.
JNCU1	NCU board (J1)	Conducts data exchange of data signals with NCU board, after modulation by the MODEM IC, and before demodulation. Also transmits control signals for the relays.
JINK1	Ink detection sensor	Receives detection signals from the ink detection sensor.
JRPS1	Recording paper sensor	Receives detection signals from the recording paper sensor.
JPOWER1	Power supply unit	Input connector for DC voltage converted by the PSU. +5V, +12V and +24V voltages are supplied.
JDRAM1	Memory board	Connects to memory board.
JSP1	Speaker	Connects to speaker.
JPES1	Paper edge sensor	Receives detection signals from the paper edge sensor.
JCR1	Carriage motor	Supplies drive voltage for the carriage motor.
JLF1	Line feed motor	Supplies drive voltage for the line feed motor.

NCU board

Connector name	Connected to	Description
J1	SCNT board (JNCU1)	See SCNT board (JNCU1)
J2	Shield plate	Earthing connector
J3	Modular board (J1)	Performs data exchanges between modular boards of suitable signal levels for the telephone line.
J4	N.C.	Reserved

OPCNT board

Connector name	Connected to	Description
J2	SCNT board (JOPCNT1)	See SCNT board (JOPCNT1)
J3	Document sensor	Receives detection signals from the document sensor.

Modular board

Connector name	Connected to	Description
J1	NCU board (J3)	See NCU board (J3)

Memory board

Connector name	Connected to	Description
J1	SCNT board (JDRAM1)	Connects to SCNT board for DRAM extension.

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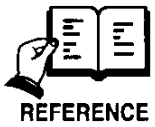
1. INSTALLATION



This machine has been designed for user installation. Therefore, this manual contains only an outline description of the procedures. For details of the installation, see the *USER'S GUIDE.*

1.1 Setting up

- Choosing a Location for Your MultiPASS
- Do you have everything?
  Check that nothing is missing when the unit is unpacked.
- Removing shipping materials
  Peel off all strips of tape from the unit. Don't forget to remove the protective sheet from the separation roller, in the scanner section.
- Assembling your MultiPASS
  Install the accessories, Document tray, Document guide, Exit tray, etc.
- Making connections
  Connect the Telephone line, Extension phone, Answering machine, Parallel cable (for PC).
- Powering up
  Connect the power cord and check that power is supplied.
- Installing the BJ cartridge
  Unseal the BJ cartridge, and load it into the machine. The instructions for this operation are written on the printer cover.
- Loading paper
  Set paper in the paper tray, in **SELECT PAPER SIZE** under **FAX PRINTER SETTING**, set the size of paper that is to be used.
- Setting the **TEL LINE TYPE**
  Choose the setting the matched the type of line being used.
- Entering user information
  Enter user information, such as **DATE & TIME, UNIT TELEPHONE #, UNIT NAME**.etc.

1.2 Checking Operations

- Copy operation
  Make a copy, and check that the operation is normal.
- Communication test
  Transmit to, and receive from other facsimiles, and check that images are sent normally for transmission, and are printed normally for reception.

What to do when trouble occurs

Very rarely, during use, the display may go out, all the buttons may stop working, or some other trouble may occur because of strong electrical noise or a large amount of static. If such trouble occurs, initialize the RAM. During installation, we recommend that you perform the all clear operation after the power on. Refer to *NOTE: "All clear" when nothing works on Page 1-49.*

2. OPTION (CFX-B380IF only)

2.1 G3 FAX OPTION MEMORY VI (2 MB)

This optional memory board increases the fax memory by 2 MB. This enables more fax pages to be stored in memory during a fax transmission or reception.

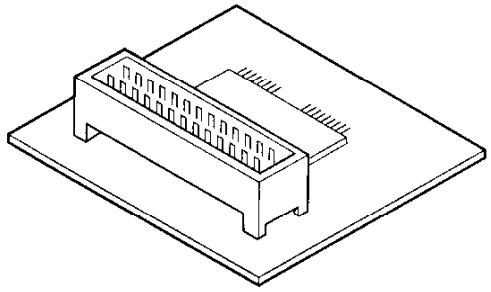


Figure 4-1 Memory Board

2.1.1 Precaution

Before installing, note the following:

- **Check the contents of the existing memory.**
  When the optional memory board is installed, the contents in the existing memory will be deleted. Therefore, any fax pages or transmission schedules stored in the memory will be lost. Insert a sheet of paper and check that the amount of memory used is 0%. If the memory contains fax pages, etc., print out the contents on paper with the suitable cartridge.

- **Prevent electric shock.**
  To prevent electric shock during the installation, be sure to disconnect the power cord from the power outlet before starting. Also, avoid touching circuit boards where it is unnecessary.

- **Prevent static charge.**
  Before handling the optional memory board, be sure to take adequate measures to prevent static charge. Static charge can destroy the electronic components on the memory board.
  Touch the frame of the Fax's power supply to discharge any static charge from your body.

NOTE

For details on static charge prevention, see the *Chapter 1: 5.3.1 Damage from static charge on Page 1-39.*

2.1.2 Installation procedure

(1) Take out the memory board from the box.

(2) Disconnect the power cord, parallel cable, and modular cord.

(3) Use a precision screwdriver to remove the rear cover as shown in *Fig. 4-2*

(4) As shown in *Fig.4-2* attach the memory board to the connector (JDRAM1) on the SCNT board.

A 0.5 MB memory board is already attached to this connector, remove it.

The board identification is described on the board. Check the part numbers.

HG5-0552: 2 MB memory board

HG5-0553: 0.5 MB memory board

When attaching the memory board to the connector, make sure that no adjacent wiring gets in the way.

(5) Reattach the rear cover. Make sure the parallel interface connector's metal fasteners do not get in the way.

(6) Insert the power cord through the inlet to supply power. After a few moments, Date and time will be displayed on the monitor. During this time, the added memory is recognized automatically, and initialization is executed.

(7) To check that the memory board is correctly installed, run a DRAM test.

If an error is displayed, repeat from step (2).

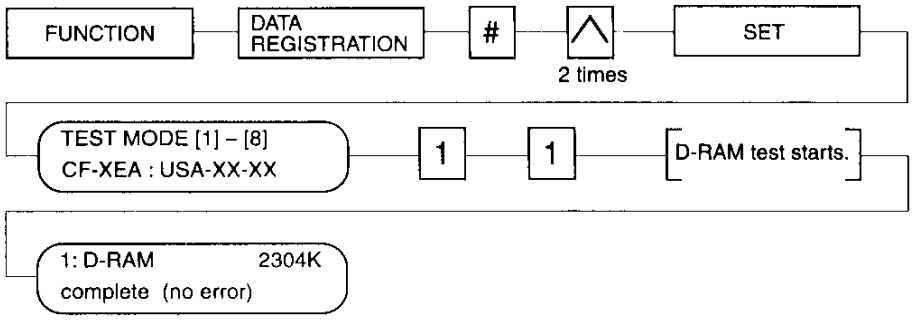


Figure 4-2 DRAM Test Procedure

(8) Reconnect the parallel cable and modular cord. This completes the installation.

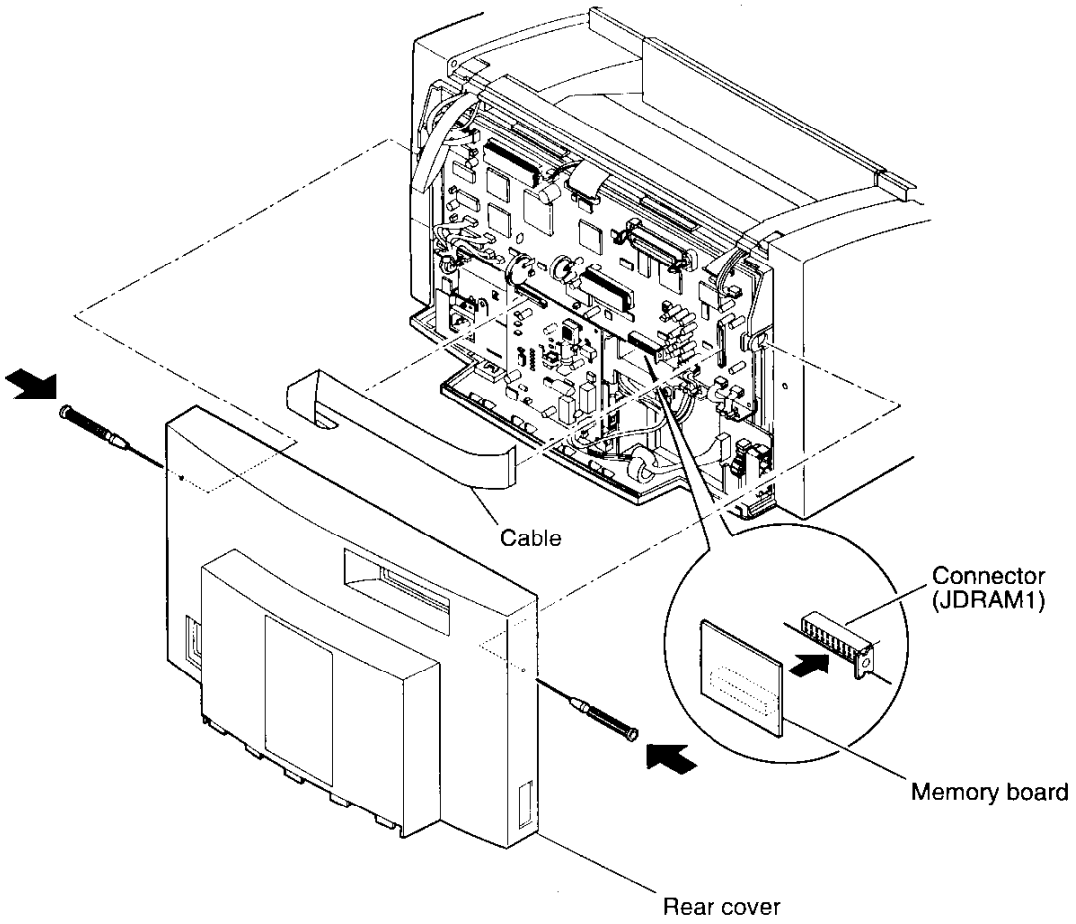


Figure 4-3 Memory Board Installation

3. USER DATA FLOW

Press the *FUNCTION* button, and then *DATA REGISTRATION* button to access User menu.

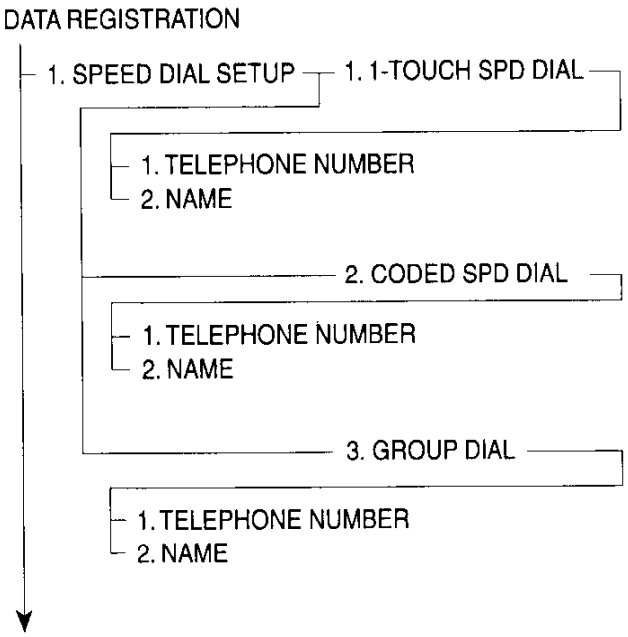


Figure 4-4 User Menu Settings (1/5)

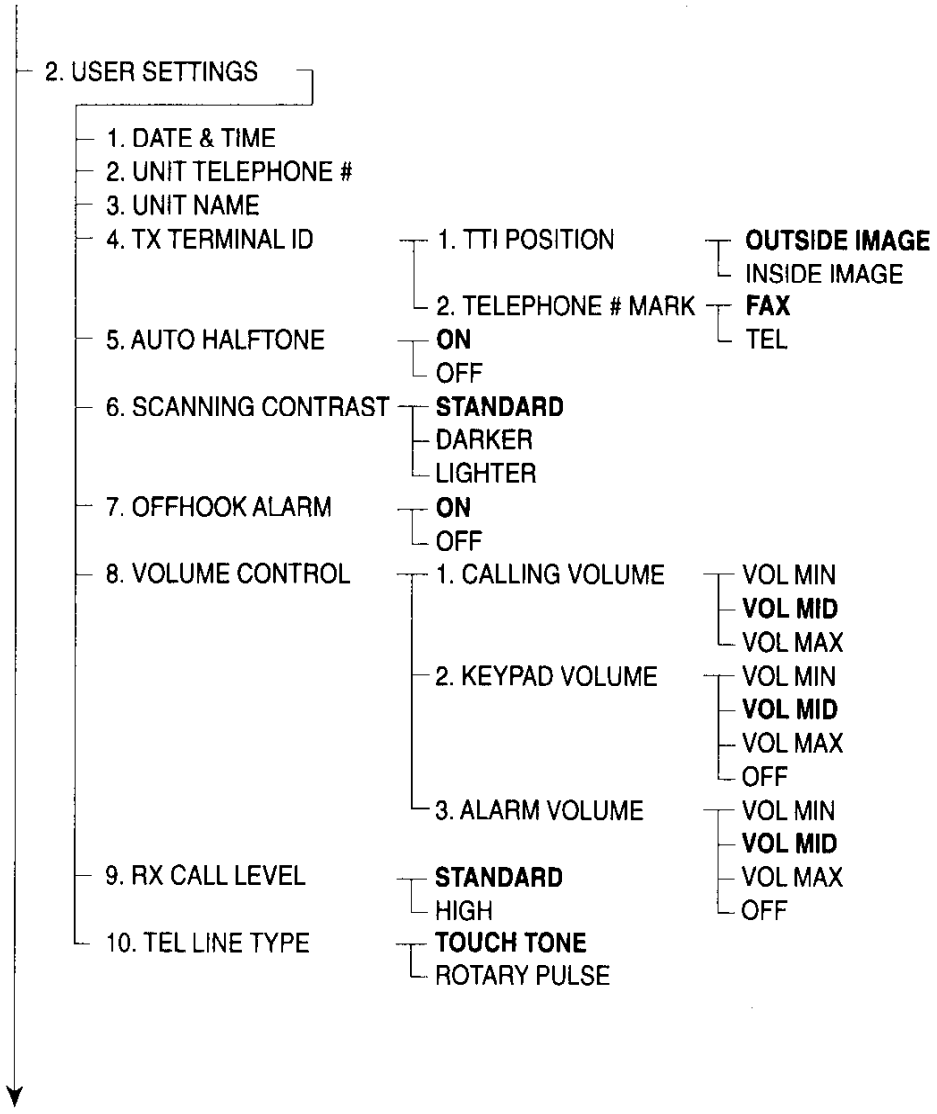


Figure 4-5 User Menu Settings (2/5)

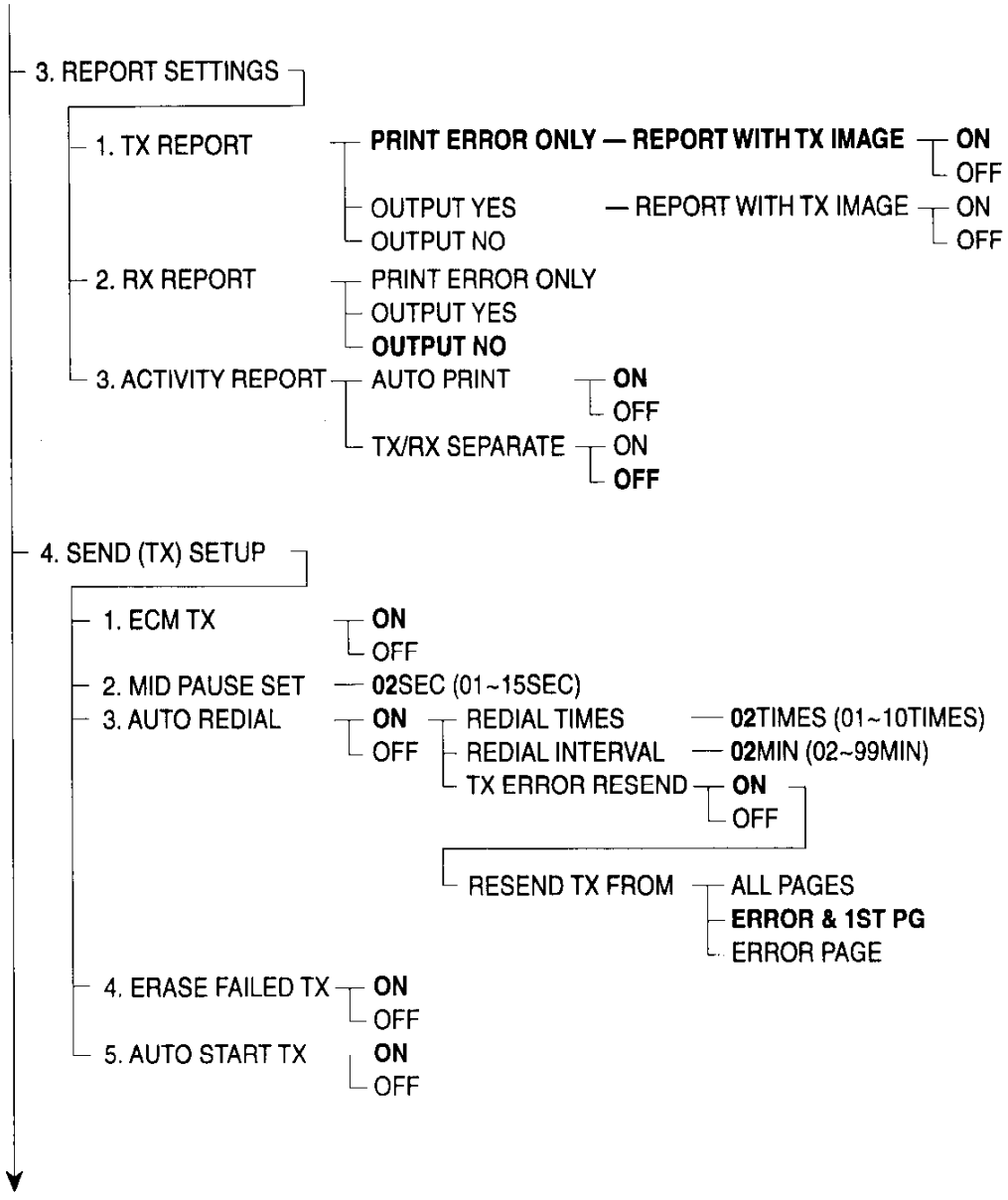


Figure 4-6 User Menu Settings (3/5)

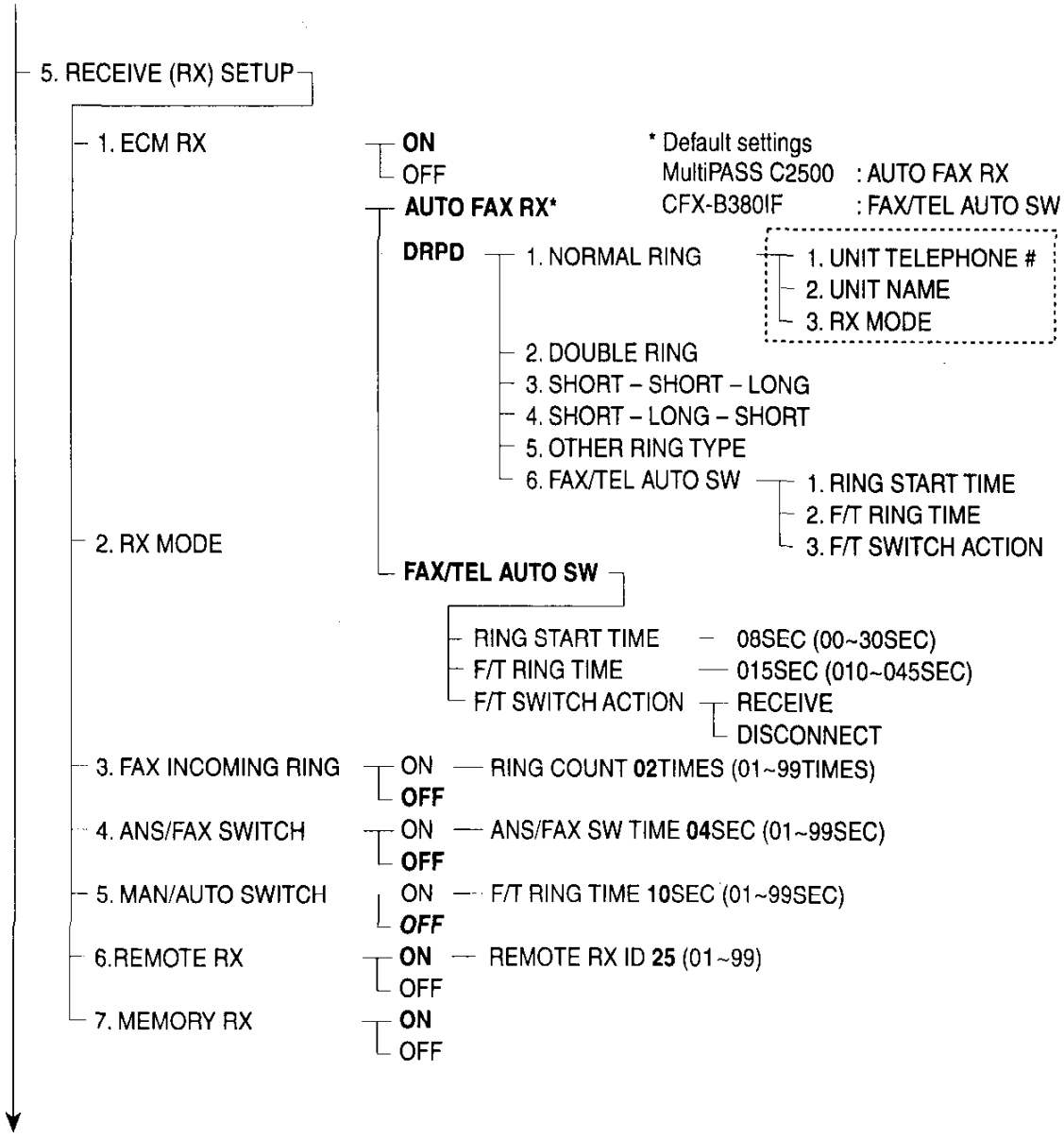


Figure 4-7 User Menu Settings (4/5)

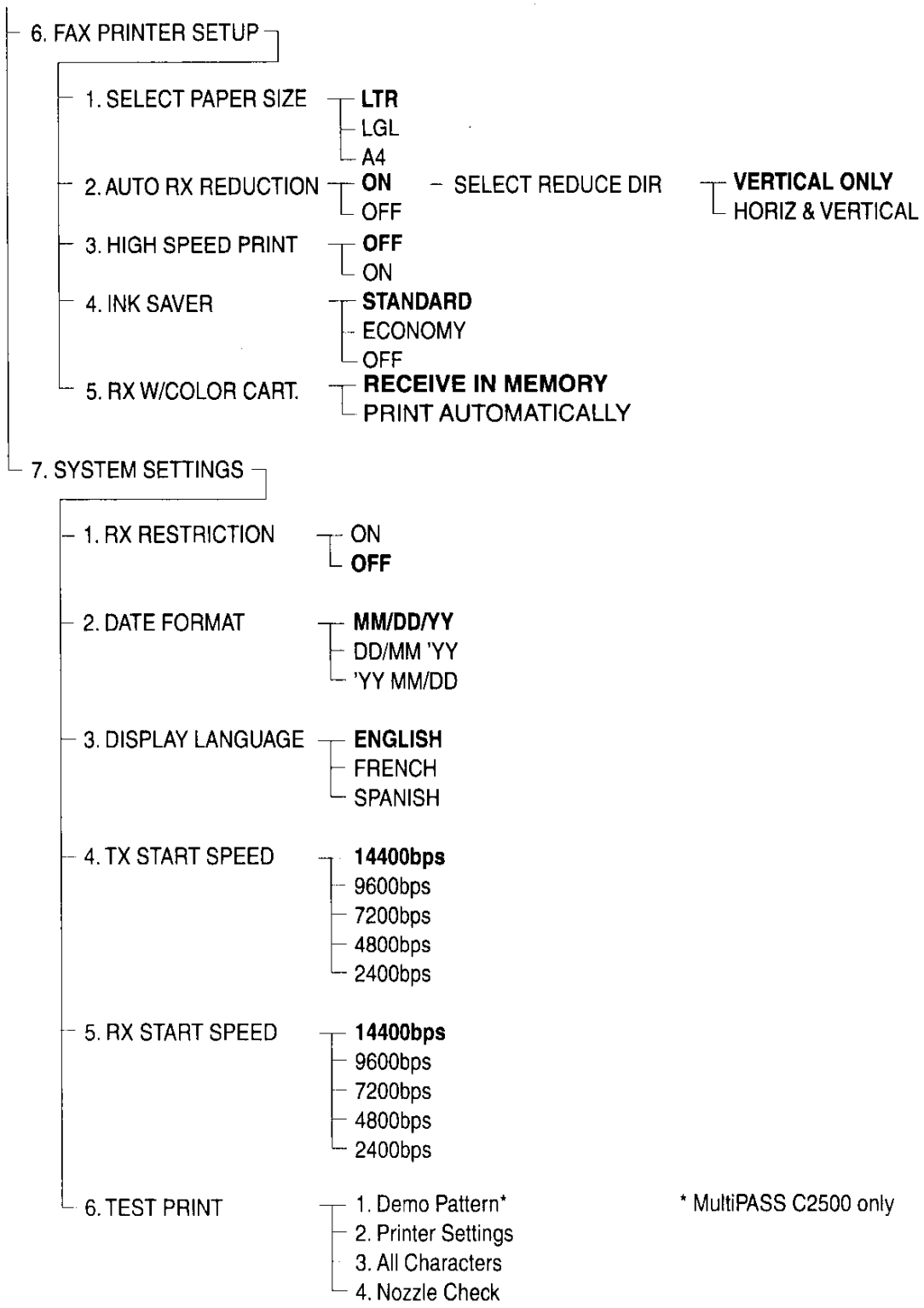


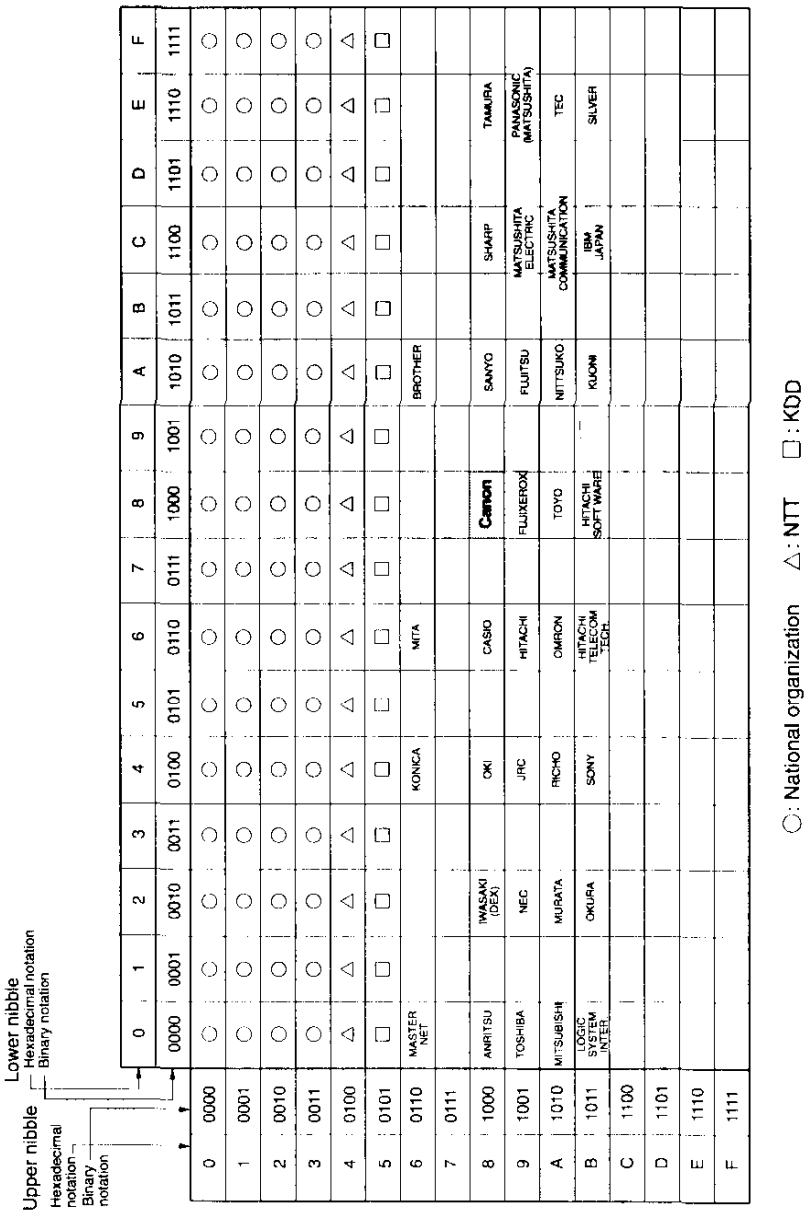
Figure 4-8 User Menu Settings (5/5)

4. MAKER CODE

The 1-byte maker code displayed on the error dump list corresponds to the list of makers shown on the following page.

REFERENCE

For a sample of a dump list containing maker codes, see *pages 3-61 ~ 3-63*



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0 0000	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
1 0001	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2 0010	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3 0011	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4 0100	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△	△
5 0101	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
6 0110	MASTER NET				KONICA		MITA		Canon		BROTHER					
7 0111																
8 1000	ANRITSU		IWASAKI (DEX)		OKI		CASIO				SANYO		SHARP		TAMURA	
9 1001	TOSHIBA		NEC		JRC		HITACHI		FUJIXEROX		FUJITSU		MATSUSHITA ELECTRIC		PANASONIC (MATSUSHITA)	
A 1010	MITSUBISHI		MURATA		RICHO		OMRON		TOYO		NITTSUKO		MATSUSHITA COMMUNICATION		TEC	
B 1011	LOGIC SYSTEM INTER.		OKURA		SONY		HITACHI TELECOM TECH.		HITACHI SOFT WARE		KUONI		IBM JAPAN		SILVER	
C 1100																
D 1101																
E 1110																
F 1111																

Figure 4-9 Maker Code

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1. FEATURES

Built-in BJ color printer design

The build-in printer works the same as the Bubble jet Full-color printer. This space-saving design occupies a minimum of desk space and makes it easy to work with the facsimile.

Convenient paper handling

The printer is equipped with an automatic sheet feeder that holds up to 150 sheets of A4/B5/LTR/LEGAL size Plain paper.

Printing is also possible on Coated paper, Transparency, Envelope, Back print film, Glossy paper, High gross film, Fabric sheet.

Emulation mode compatibility

Two resident printer control modes allow the printer to emulate other printers: BJ mode provides emulation of the IBM Proprinter X24E printer, and Epson LQ mode provides emulation of the Epson LQ-2550 printer.

This means your printer is compatible with a wide variety of software DOS applications including those that support the Proprinter X24E and LQ-2550, as well as any of the other Canon Bubble Jet printers (BJC-70 or BJC-4100).

Choice of print modes/speeds

Two print modes allow you to choose between print quality, speed, and quietness.

HQ is high quality mode, which provides high quality output along with high speed printing of 347* characters per second (cps). HS is high speed mode, which allows draft quality printing at a speed of 495* cps.

* when BC-20 use

Excellent print quality

The high-performance print head of the ink cartridge offers 720 × 360 dots per inch (dpi) for high resolution graphics.

Automatic printer ON/OFF

When you print data using the MultiPASS Server & MultiPASS printer driver under Windows, the printer lamp lights automatically and goes off after printing.

(The printer is turned on and off by means of software.)

2. SPECIFICATIONS

2.1 Basic Specifications

Type

Serial dot matrix on-demand thermal ink jet printer

Auto sheet feeder capacity

Plain paper	Max. 15 mm (approx. 150 pages)
Envelopes	20 envelopes (commercial, number 10 or european DL-size)
Special media	50 sheets (except for Fabric sheet)
Fabric sheet	1 sheet

Print control mode

BJ mode (IBM Proprinter X24E emulation)
LQ mode (Epson LQ printer emulation)
(Canon extended mode shall be selected when the MultiPASS printer driver is used.)

Buffer size

Mode	Receive buffer	Download buffer
BJ mode/LQ mode	32 KB (or 4 KB)	0 KB (or 32 KB)

Printing speed

Cartridge	BC-20(Black printing)	BC-21(Black printing)
HQ mode	347 cps	173 cps
HS mode	495 cps	247 cps

Measured in 10 cpi burst print
cps: characters per second
cpi: characters per inch

Print direction

Uni-directional
(Print direction automatically changes according to optimum printing directional control.)

Maximum print width

8.2"

Line feed speed
Approx. 120 ms / line feed (2/6" line feed)

Line feed pitch
BJ mode 1/6", 1/8", n/60", n/72", n/180", n/216", n/360"
LQ mode 1/6", 1/8", n/180", n/360"
The n is programmable value.

Reduction print mode
none

Paper feed method
Automatic sheet feed

Printable characters

Fonts

BJ mode / LQ mode	Courier, Prestige, Gothic, Script, Roman, Draft

Character pitch

BJ mode	10, 12, 17 cpi, and PS
LQ mode	10, 12, 15, 17, 20 cpi, and PS

Character configuration

HQ mode	36 (horizontal) × 48 (vertical) dots
HS mode	18 (horizontal) × 48 (vertical) dots (zigzag line)

Character set

BJ mode	IBM Character set 1, 2, All characters set
LQ mode	Italic character set / Graphic character set

Code page

BJ/ LQ mode	437(USA), 850(Multiligual), 852(East Europe), 855(Cyrillic), 857(Turkish), 860(Portuguese), 863(Canadian French), 864(Arabic),865(Norway), 869(Greek)

International Character set

LQ mode	USA, UK, Germany, France, Denmark1, Denmark2, Sweden, Italy, Spain1, Spain2, Japan, Norway, Latin America, Korea, Legal

Number of columns printed

BJ mode

Character type	Pitch	cpl
10 cpi (Pica)	10 cpi	80 cpl
10 cpi doublewide (Pica enlarged)	5 cpi	40 cpl
10 cpi condensed (Pica condensed)	17 cpi	136 cpl
10 cpi condensed-doublewide (Pica condensed-enlarged)	8.5 cpi	68 cpl
12 cpi (Elite)	12 cpi	96 cpl
12 cpi doublewide (Elite enlarged)	6 cpi	48 cpl
Proportional spacing	PS	Varies

LQ mode

Character type	Pitch	cpl
10 cpi (Pica)	10 cpi	80 cpl
10 cpi doublewide (Pica enlarged)	5 cpi	40 cpl
10 cpi condensed (Pica condensed)	17 cpi	136 cpl
10 cpi condensed-doublewide (Pica condensed-enlarged)	8.5 cpi	68 cpl
12 cpi (Elite)	12 cpi	96 cpl
12 cpi doublewide (Elite enlarged)	6 cpi	48 cpl
12 cpi condensed-doublewide (Elite condensed)	20 cpi	160 cpl
12 cpi condensed-doublewide (Elite condensed-enlarged)	10 cpi	80 cpl
15 cpi (Micron)	15 cpi	120 cpl
15 cpi doublewide (Micron enlarged)	7.5 cpi	60 cpl
Proportional spacing	PS	Varies

cpl: characters per line

Bit image

Vertical 8, 24, 48 dots

Horizontal 60 dpi/ 120 dpi/ 180 dpi/ 240 dpi/ 360 dpi/ 720 * dpi

* In smoothing mode or when using MultiPASS printer driver

dpi: dot per inch

Paper size

LETTER/LEGAL/A4/B5

Envelope commercial, number 10 (4.1"×9.5")

Envelope european DL-size (8.66"×4.33")

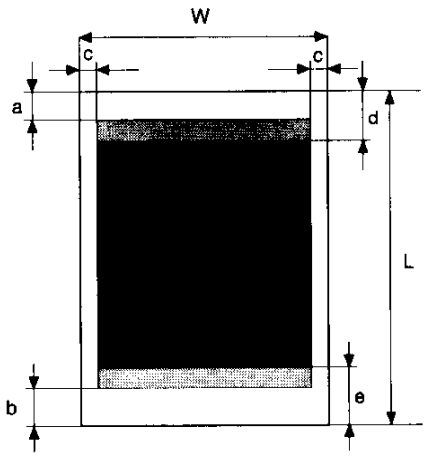
Paper type

Plain paper
Coated paper
Transparency (Canon transparency film CF-102)
Envelope (Commercial number 10 or DL-size)
BPF (Canon back print film BF-102)
High gross film (Canon High gross film HG-101)
Glossy paper (Canon glossy paper GP-101)
Fabric sheet (Canon Fabric sheet FS-101)

Printing range

Plain paper and Special media

W × L = Min. 7.17 × 1012 inch(182 × 257 mm)
Max. 8.5 × 14.0 inch(216 × 356 mm)



Feed direction

a = (Plain paper , etc.) 0.12 inch/3.0 mm
(Fabric sheet only) 1.5 inch/38.1 mm

b = 0.27 inch
7 mm

c = (A4) 0.13 inch/3.4 mm
(LTR, LGL) 0.25 inch/6.4 mm

d = (BC-20 Cartridge) 0.73 inch/18.5 mm
(BC-21 Cartridge) 0.91 inch/23 mm

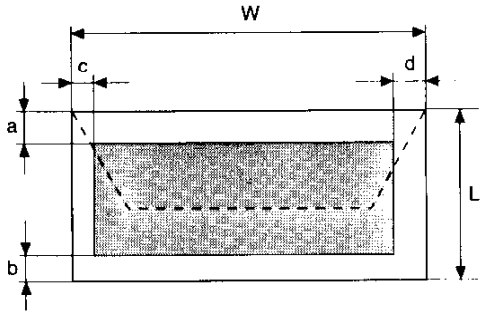
e = (BC-20 Cartridge) 0.87 inch/22 mm
(BC-21 Cartridge) 0.95 inch/24 mm

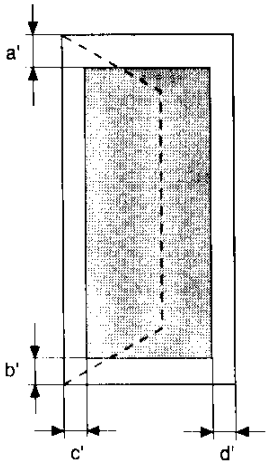
: Recommended printing area

: Printable area
(contains recomended printing area)

Envelopes

W × L = (COM #10)
9.48 inch/241 mm × 4.17 inch/106 mm
(DL)
8.66 inch/220 mm × 4.33 inch/110 mm





Feed direction

a = a' = (BC-20 Cartridge) 0.59 inch/15 mm
(BC-21 Cartridge) 0.76 inch/19.5 mm

b = b' = 0.28 inch/7 mm

c = c' = 0.25 inch/6.4 mm

d = (COM #10) 1.24 inch/31.4 mm
(DL) 0.41 inch/10.4 mm

d' = 0.25 inch/6.4 mm

Figure 1-1 Printing Range

2.2 Interface Specifications

The parallel interface sends 8 bits (one byte) of data at one time and is transistor-transistor-logic (TTL) compatible.

Interface type

IEEE P1284/Bi-directional parallel

Data transmission

8-bit parallel interface (IBM PC or compatible)

Synchronizing signal

STROBE signal from the computer

Handshake

BUSY/ACKNLG

Interface connectors

Printer side	Amphenol 57-40360 or equivalent
Cable side	Amphenol 57-30360 or equivalent

Recommended interface cable

Type	Twisted-pair shielded cable
Material	AWG No.28 or larger
Length	Up to 6.56 feet (2.0 m)

Signal voltage levels

Low level	0.0 V to +0.4 V
High level	+2.4 V to +5.0 V

Signal circuit

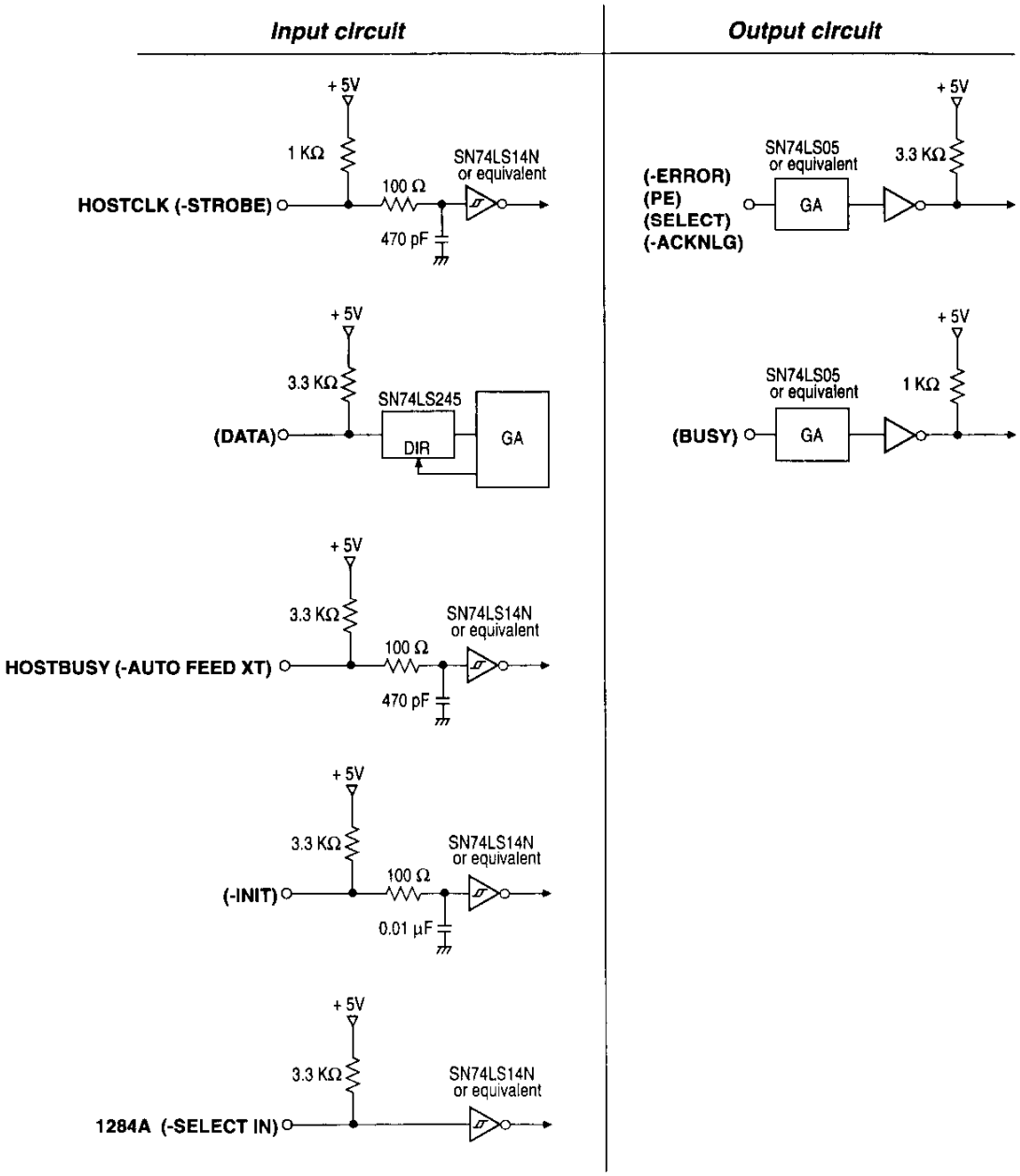


Figure 1-2 Signal Circuits

Connector signals

The following table lists the signals and input/output status of the pin assignments used for parallel communication.

Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	-STROBE	Input	19	-STROBE -RET*1	
2	DATA1	Input	20	DATA1 -RET	
3	DATA2	Input	21	DATA2 -RET	
4	DATA3	Input	22	DATA3 -RET	
5	DATA4	Input	23	DATA4 -RET	
6	DATA5	Input	24	DATA5 -RET	
7	DATA6	Input	25	DATA6 -RET	
8	DATA7	Input	26	DATA7 -RET	
9	DATA8	Input	27	DATA8 -RET	
10	-ACKNLG	Output	28	-ACKNLG -RET	
11	BUSY	Output	29	BUSY -RET	
12	P.E.	Output	30	P.E. -RET	
13	SELECT	Output	31	-INIT	Input
14	-AUTO FEED XT*2	Input	32	-ERROR	Output
15	No Connection		33	GND	
16	GND		34	No Connection	
17	GND		35	+5.0V*3	Output
18	+5V*4	Output	36	-SLCT IN*2	Input

*1. All -RETs are connected to GND.
*2. These signals are valid only in Epson LQ mode.
*3. This signal is connected to +5.0V via 3.3kΩ resistor.
*4. The level is raised to +5V at 390Ω resistor.

Signal descriptions

-STROBE

When the printer receives a low -STROBE pulse of width greater than 0.5µs from the computer, it reads the data from the interface and makes the BUSY line high.

DATA

These signals are the 8 bits of parallel data from the computer. A high level indicates a logical 1; a low level, a logical 0. The printer reads the DATA lines when a -STROBE pulse is received.

-ACKNLG

The ACKNLG pulse tells the computer that the printer has read the data from the previous -STROBE pulse. An -ACKNLG pulse is also generated when the printer is powered on, or at the completion of printer initialization by an -INIT signal requested from the computer.

BUSY

When the printer makes BUSY high, it cannot receive data. The BUSY line goes high in response to a -STROBE pulse. This line remains high until the data are read. BUSY is also high under the following conditions:

- The receive buffer is full of data.
- The printer receives an -INIT signal.
- The *PRINTER* button is pressed to set the facsimile mode.
- A printer error condition, such as out-of-paper, occurs.

P.E. (Paper End)

The printer sets P. E. high when it is out of paper or when a paper jam occurs. P. E. remains high until the operator loads paper and presses the *ON LINE* button.

SELECT

When the printer is ready, it sets the SELECT line high. The SELECT line goes low when:

- The operator presses the *PRINTER* button to set the facsimile mode.
- An error condition, such as out-of-paper, occurs.
- The printer receives the Printer Deselect command. It ignores all incoming data except DC1, which returns the printer to a selected state.

-AUTO FEED XT

If this signal is low when the printer is initializing, the printer automatically feeds the paper one line when it receives a carriage return (CR) control code. This signal is valid only in Epson LQ mode.

-INIT

-INIT from the system resets the printer to its initial power-on state. The BUSY line goes high, and any received data are printed. When -INIT goes low, the printer resets itself to the power-on default state.

-ERROR

The printer sets the ERROR line low if it detects an error, such as an out-of-paper condition.

-SLCT IN

When this signal is high at initializing the printer, the DC1 and DC3 control codes are valid; otherwise, they are invalid. This signal is valid only in Epson LQ mode.

Timing chart

The parallel interface transfers data in one direction only: from computer to printer. The data path is 8 bits wide. The printer and the computer synchronize data transfer with the interface signals, -STROBE, -ACKNLG, and BUSY.

When the computer is ready to send a byte of data to the printer, it puts the byte of data on the data lines (DATA 1 through DATA 8). Then the computer sends a -STROBE pulse to the printer. The printer responds with a BUSY signal.

When the printer receives the data, it pulses the -ACKNLG line. This signals the computer that the printer has read the byte of data into the printer memory. If the printer buffer is not full and it can receive more data, it removes the BUSY signal.

The timing charts that follow illustrate the data and handshake lines during the transfer of one data byte from the computer. DATA 1 through DATA 8 and the -STROBE line are driven by the computer; the -ACKNLG line is driven by the printer.

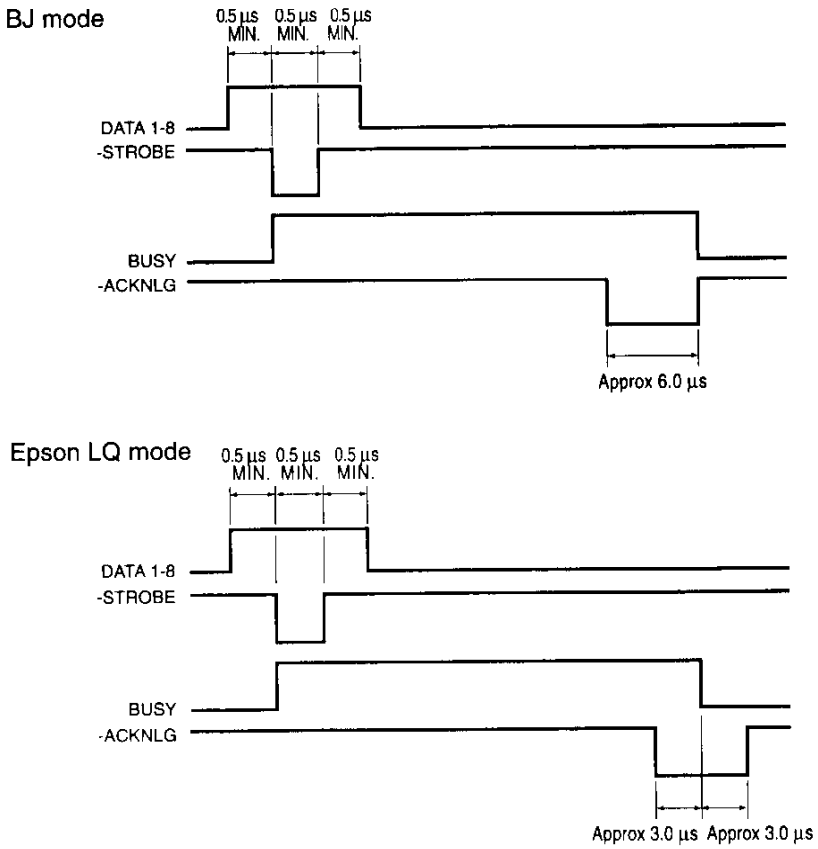


Figure 1-3 Interface Timing

2.3 Factory Default Settings (Emulation mode)

The following table shows the factory default settings of the printer:

Function	Setting
Paper Selection	Letter
Print Mode	High Quality
Smoothing	Disable
Automatic Power Off	Disable
Font(LQ)	Roman
Font(BJ)	Courier
Code page(LQ)	437
Code page(BJ)	437
Page Length(LQ)	22 inches
Page Length(BJ)	11 inches
Character set (LQ)	Graphics
Character set (BJ)	Set 1
Text Scale(LQ)	Disable
Text Scale(BJ)	Disable
Download Buffer	Disable
Automatic Line feed(LQ)	CR=CR
Automatic Line feed(BJ)	CR=CR
Automatic Carriage Return	LF=LF
Alternate Graphic Mode	Disable
International Character	U.S.A.
Printer Port	LPT1

NOTE

This printer has two printer control modes: BJ mode, which emulates the IBM Proprinter X24E, and Epson LQ mode, which emulates the Epson LQ-2550. The default setting is Epson LQ mode. If you change this to BJ mode, the default settings also change.

3. OVERVIEW

3.1 Interface Connector

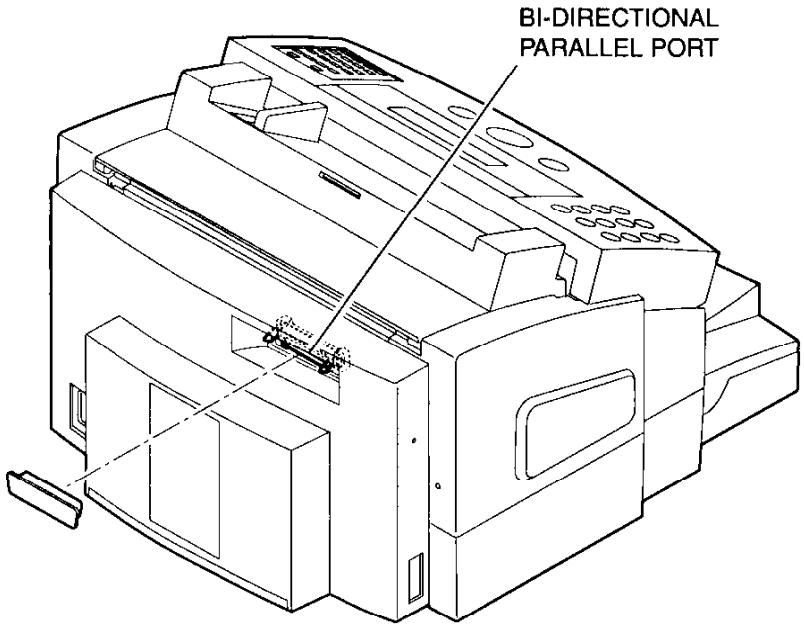
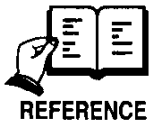


Figure 1-4 Interface Connector

3.2 Printer Operation Panel



See *Part1: Facsimile, Chapter 1: General Description*, for details.

4. SAFETY & PRECAUTIONS

4.1 Personal Hazards

REFERENCE

For details on danger to personnel, see *Part 1: Facsimile, Chapter 1: 5.SAFETY & PRECAUTIONS.*

4.2 General Cautions

4.2.1 Connecting the Interface cable

a) Electrostatic discharge

To protect the interface circuit from electrostatic discharge damage when connecting the interface cable, never touch the parallel interface connector terminals.

b) Rush current

To protect the interface circuit from rush current damage when connecting or disconnecting the interface cable, make sure that the computer power is off and the fax outlet is pulled out to turn the power off.

4.2.2 Data lost when power cord is pulled out

When the power cord is pulled out, following data will be lost:

- Downloaded font image in the DRAM.
- Current print data in the DRAM (receive/print buffer).
- Current printer settings by application software.

After the power cord is plugged in again, and the printer function turned on by pressing the *FUNCTION* button and the *PRINTER* button, the printer will change the printer settings to the default setting, except the BJ printer settings.

4.2.3 Data reset

When this fax is reset by service data #8 CLEAR, the BJ printer settings will be changed to the default settings.

REFERENCE

For detailed information about service data #8 CLEAR, see *Part 1: Facsimile, Chapter 3: 5.2 Service Data Setting page 3-33.*

5. RESTRICTIONS

While in the printer mode, some operations are restricted as follows:

Yes	No	Operation
✔		Memory Fax Reception
	✔	Regular Fax Reception (Document printed)
✔*		Memory Fax Transmission
✔*		Polling Rx. (Other unit has the document)
✔		FAX/TEL Switching
✔		Extension Telephone Communication (Connected to external jack)
✔		Answering Machine (Connected to external jack)
✔		Telephone Handset Communication

* Memory Tx/polling Rx in the printer mode cannot be set. Call operations for preset memory Tx/polling Rx are carried out even in the printer mode.
Memory Tx : Delayed transmission, redial standby for memory transmission.

1. THEORY OF OPERATIONS

2.1 Outline

In the facsimile mode, the printer part prints the received image from the facsimile circuit as described in Part 1. In the printer mode, the printer part prints the character and image data from the computer via the centronics type 8-bit parallel interface.

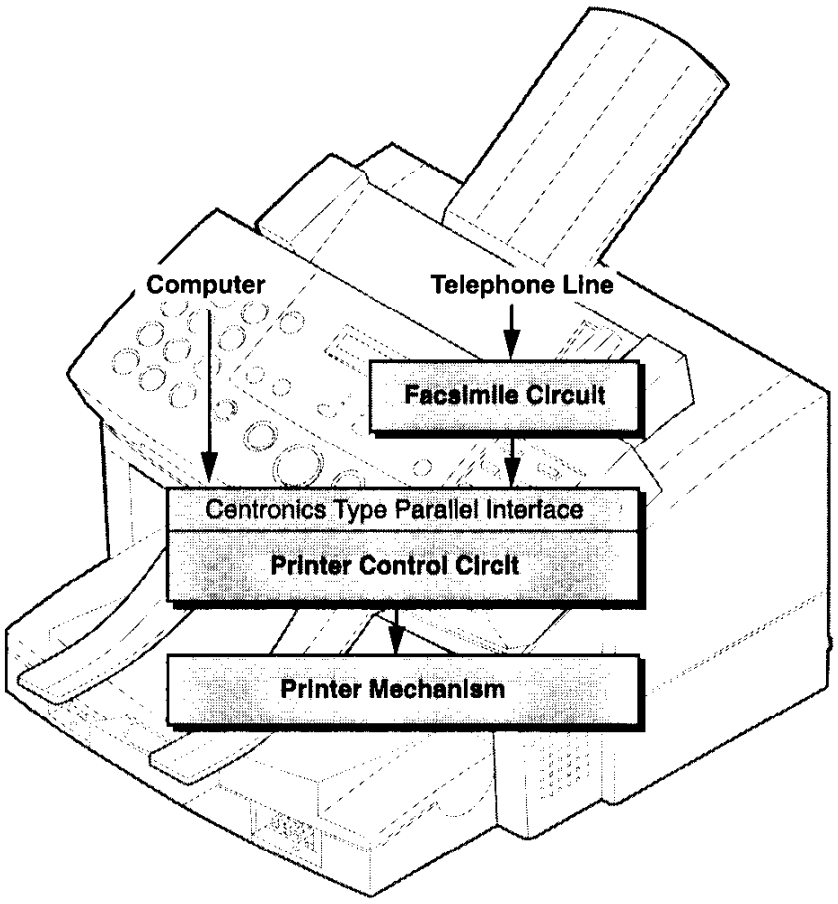


Figure 2-1 Printer Outline

2.2 Mechanical Overview

For details on mechanical overview of printer mechanism, see *Part 1: Facsimile, Chapter 2: Technical Reference*.

2.3 Data Flow

1) Interface

Character codes, control codes, and image data conforming to the printer's character table are sent to the interface from the computer. The data are received when the printer is in on-line standby, or when the carriage changes directions during printing.

2) Input buffer

Data received from the interface are stored in the printer DRAM's built in input (reception) buffer.

3) Data analysis and printer buffer

The MPU analysis the data stored in the input buffer, and printing image data for each nozzle of the BJ cartridge are stored in the printer DRAM's built-in print buffer.

If there are character data, the Control/CG ROM font image data are stored in the print buffer. Control codes are used for switching print modes, etc. The image data are already formatted for each nozzle of the BJ cartridge, and are stored as is in the print buffer.

4) Printing

When control codes with a CR/LF, etc, print start function are processed, and the print buffer becomes full, the image data stored in the printer buffer are sent to the BJ cartridge and printed out.

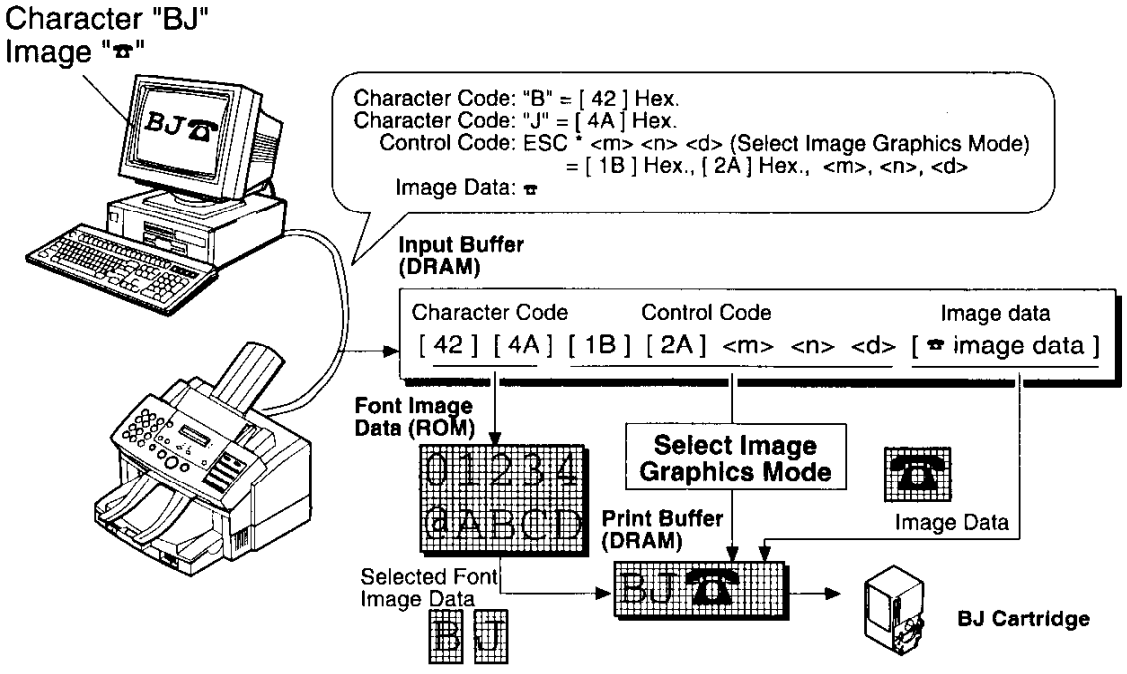

Character "BJ"
Image "☎"
Character Code: "B" = [42] Hex.
Character Code: "J" = [4A] Hex.
Control Code: ESC * <m> <n> <d> (Select Image Graphics Mode)
= [1B] Hex., [2A] Hex., <m>, <n>, <d>
Image Data: ☎
Input Buffer (DRAM)
Character Code
Control Code
Image data
[42] [4A] [1B] [2A] <m> <n> <d> [☎ image data]
Font Image Data (ROM)
Select Image Graphics Mode
Print Buffer (DRAM)
Image Data
Selected Font Image Data
BJ Cartridge

Figure 2-2 Data Flow (image)

2.4 Printing

The printer prints the fonts horizontally, and feeds the paper vertically.

The printing design of the fonts are written into the font ROM*, and is usually made up of 360 dpi; 48 nozzles × 36 dots × 2 lines. Nozzles 49 to 60 and 113 to 124 are for spacing to next line, and for IBM block graphic character printing. Nozzles 61 to 64 and 125 to 128 are not used in printer mode**.

The default character pitch in the horizontal direction is 10 cpi (characters per inch). The default line feed pitch in the vertical direction is 1/6 inch line feed (6 lpi).

*As Microsoft Windows® or Windows 95® creates the font image data in the computer, and then transmits them, the font image data in the Control/CG ROM cannot be used.

**Because there is no larger than 1/6 inch line feeding in the printer mode. In the facsimile mode, all 128-nozzles are used for printing.

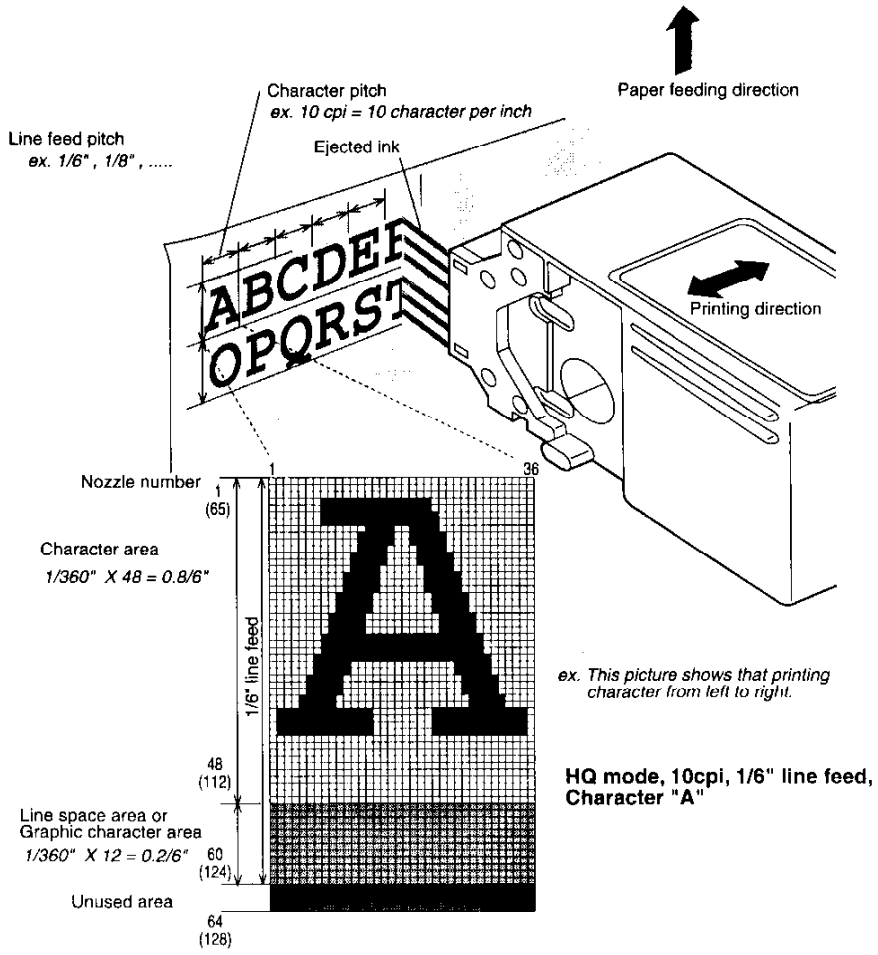


Figure 2-3 Character Printing

2.5 Circuit Overview

2.5.1 Printer circuit

This printer circuit is the same as the circuit for the facsimile printer. This section explains the operations of the circuit in printer mode.

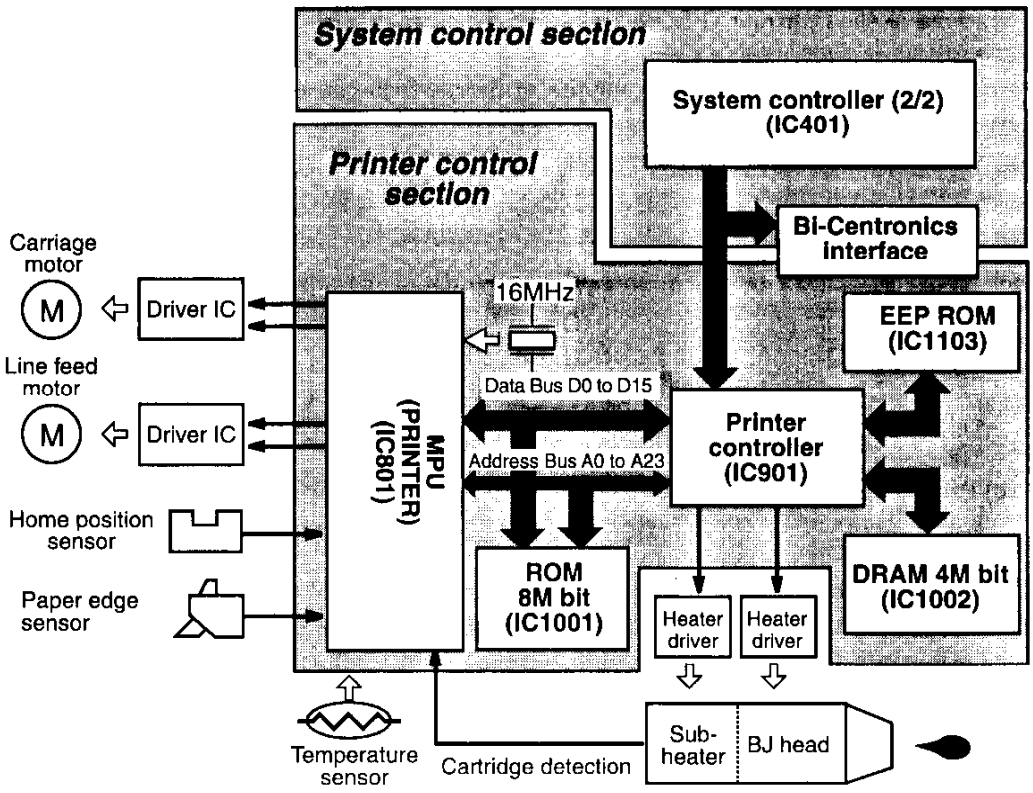


Figure 2-4 Printer Circuit Block Diagram

a) MPU (IC801)

Printer controller (IC901) is controlled by the Control/CG ROM (IC1001) program to control printer mode operations.

b) Control/CG ROM (IC1001)

Besides the printer hardware control program and font image data, the following data are stored in the Control/CG ROM.

- Emulation software

  This is the control program for the printer, which can emulate either IBM Proprinter X24E, or EPSON LQ-2550.

- Font image data

  The 360 dpi character design data for each of the BJ cartridge nozzles.

  When the printer is emulating IBM Proprinter X24E, the character designs from Character Set 1, 2, All Characters Chart, Code Page; 437(USA)/ 850 (Multilingual)/ 852 (East Europe)/ 855 (Cyrillic)/ 857 (Turkish)/ 860 (Portuguese)/ 863 (Canadian French)/ 864 (Arabic)/ 865 (Norway)/ 869 (Greek) can be selected. When the printer is emulating EPSON LQ-2550, the EPSON Italics Character Set, EPSON Graphics Set can be selected, and the language chosen from the International Character Set.

- Mask patterns in fine mode

c) Printer controller (IC901)

The main functions of the system controller as follows:

- Interface controller

  The centronics interface controller receives 8-bit parallel data sent from the computer in synchronization with the data strobe pulse by BUSY / -ACK handshaking It controls other interface signals. The data received from the interface are stored in the receive buffer in DRAM, and is analyzed by the MPU. If the printer initialize signal -INIT is input to the printer controller and MPU from the interface, the printer controller outputs the BUSY status immediately, and the MPU prints printing data stored in the print buffer, then initializes the printer.

- Buffer controller

  The buffer controller automatically writes received data into the receive buffer in DRAM, controls the remaining data in the receive buffer, reads data from the receive buffer, and clears data after reading.

d) DRAM (IC1002)

Besides the printer hardware control data storage area, the DRAM comprises the following;

- Input buffer

  Reception data from the interface are stored momentarily. The data are then analyzed by the MPU, and then erased to make room for the next data.

- Printer buffer

  Two lines of BJ cartridge print data are stored. After being printed out, the data are then erased to make room for the next data.

- Download buffer

  When emulating the IBM Proprinter X24E, besides the data stored in the ROM, font image data are transferred from the computer and stored.

2.6 720 dpi Printing/Smoothing Feature

2.6.1 Canon extension mode

In the Canon extension mode, the printer driver creates 720 dpi data for the horizontal axis and sends it to the printer, resulting in high-quality printing.

With a black BJ cartridge installed, the printer driver smoothies the printed character's edges at 720 dpi along the horizontal axis. The 720 dpi data for the horizontal axis is sent to the printer and the edges are smoothed at a high resolution.

When a color BJ cartridge is installed, the multi-value data of the picture elements processed by the printer driver for color correction, etc., is assigned three values (no printing, single-dot printing, two-dot printing) for the picture elements. In the case of two-dot printing, the second dot is printed in the 720 dpi position. As a result, the degree of gradation is high in the printing.

2.6.2 Emulation mode

When a black BJ cartridge is installed for printing, the printed character's edges can be smoothed at a high resolution of 720 dpi along the horizontal axis. Dots along the character's edges are added or deleted for smoothing the edge. Along the horizontal axis, dots are also overlapped by a half-dot space. This eliminates jaggies and increases the equivalent horizontal resolution at twice.

This smoothing feature greatly improves low-resolution, 180 dpi characters. However, it does not give noticeable improvement to True Type fonts and illustrations.

Note that with a color BJ cartridge installed, the emulation mode's smoothing feature cannot be used.

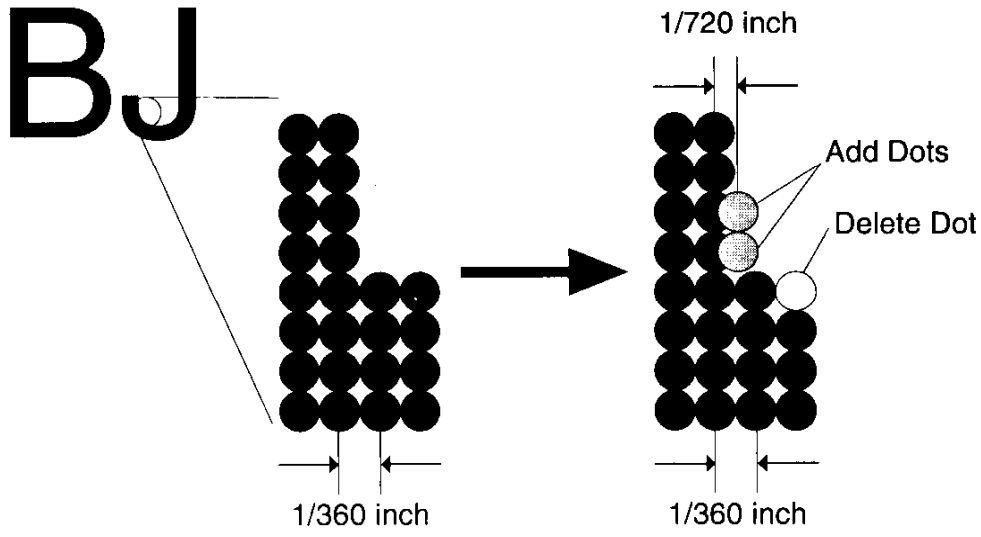


Figure 2-5 720 dpi Printing/Smoothing Feature

2.7 Printing Modes

2.7.1 Printing mode

Depending on the cartridge installed, the medium, the printing mode, the resolution, the printing data, etc., the printer varies the carriage movement, bubble jet head driving frequency, etc., to attain high-quality printing without any bleeding or shifting in the printout.

When the 720 dpi printing/smoothing feature is used, the carriage feed pitch is set to 1/720 inch. Although this slows down the carriage speed, the bubble jet head's driving frequency(heat frequency) is increased so that the overall printing throughput decreases.

During color printing at a single pass, the different colors printed at the same time overlap, often causing the colors to bleed. By printing with three passes, color bleeding is less prone to occur since the color printed immediately before is stable by the time the next color is printed over it.

When printing data is processed internally by the printer, the data is recognized and the number of ink nozzles to be used by the black ink is changed automatically.

The printing method for the respective printing modes are listed below.

Table 2-1 Printing Modes and Heating Method

With a Black BJ Cartridge

Printing Mode	Carriage Movement	Number of Nozzles	Heat Frequency [*1]
Bk-HQ	1 pass	128 nozzles	6.25KHz [3.57KHz (7.14KHz)]
Plain paper	2 passes	64 nozzles	6.25KHz [3.57KHz (7.14KHz)]
Bk-HS	1 pass	128 nozzles	8.93KHz
Not plain paper	4 passes	32 nozzles	6.25KHz [3.57KHz (7.14KHz)]

With a Color BJ Cartridge

Printing Mode	Carriage Movement	Number of Nozzles	Heat Frequency [*1]
Bk-HQ	1 pass	64 nozzles for black	6.25KHz [3.57KHz (7.14KHz)]
Plain paper	2 passes	32 nozzles for black	6.25KHz [3.57KHz (7.14KHz)]
Bk-HS	1 pass	64 nozzles for black	8.93KHz
Not plain paper	4 passes	16 nozzles for black	6.25KHz [3.57KHz (7.14KHz)]
Color-HQ*2	1 pass*3	Switches automatically between 8, 24, or 64 nozzles	6.25KHz [3.57KHz (7.14KHz)]
Color-HS	1 pass	Switches automatically between 24 or 64 nozzles	8.93KHz
Color-Fine	3 passes	8 nozzles	6.25KHz [3.57KHz (7.14KHz)]

*1 [ ]: Carriage speed (heat frequency) for 720 dpi printing/smoothing.

*2 When the printing resolution is 720 dpi, the plain paper cannot select.

*3 When the printing resolution is 720 dpi, processing to prevent color bleeding at the borders is not executed. (Carriage movement fixes 1 pass)

2.8 Optimum Printing Direction Control

To prevent vertical misalignment of the printed characters, etc., when printing data is printed continuously in the direction of the paper feeding direction, printing is executed with the carriage moving from only one direction.

However, when the printing in the paper feeding direction is not continuous, since vertical misalignment is not so noticeable the printing direction is alternated so that printing is also executed from the opposite carriage direction. This improves the throughput.

If four or more successive null rasters are detected in the lower (in the direction of paper ejection) 64 nozzles (24 nozzles with a color BJ cartridge) for the printing data in the printer buffer during single-pass printing, printing is executed up to the null raster. From the null raster onward, the printing is executed from the opposite carriage direction. From the next raster onward, the printing is executed from the same carriage direction until the direction changes again.

2.9 Automatic Emulation Switching

The printer analyzes the control command received from the host computer and determines whether it is the BJ mode or LQ mode. The emulation mode is thereby switched automatically. The BJ printer setup utility program can be used to turn on or off the automatic switching of the emulation mode.

Control command recognition

By recognizing the control command received from the host computer, the printer can determine which emulation mode to set. The printer determines the emulation mode when the control command is received at any of the following times: After the power is turned on and no printing data has been received, when no printing data has been received for over 10 seconds, or when the printer has no printing data.

Switching the emulation mode

The emulation mode is switched automatically at any of the following times:

When the printer has received over 512 bytes of data, when the data reception (even for data less than 512 bytes) has been interrupted for over 3 seconds, or when the power has been turned off before over 512 bytes of data is received or before over 3 seconds of data reception.

NOTE

Upon shipment from the factory or when the EEPROM is reset, **"Invalid"** is set. Immediately after **"Valid"** is set, the emulation mode that was set immediately before will be valid.

There are control commands with which the printer cannot determine the emulation mode to set. If the emulation mode set automatically is not the right one, use the BJ printer setup utility program or the manual default setting to cancel the automatic switching of the emulation mode and set the emulation mode manually.

2.10 Ink Smear Control

Immediately after the printed sheet is ejected from the printer, the ink dries naturally on the Paper output tray. If the next printed sheet is ejected before the ink dries on the preceding sheet on the Paper output tray, the ink may be smeared when the sheet slides over the preceding one. To prevent this, a wait is applied during the printing so that the sheet is ejected with a delay, giving more time for the ink on the preceding sheet to dry.

When a black BJ cartridge is used (whose printing speed is faster) and high duty printing is completed, the printer automatically detects the printing position of the high duty printing and the time elapsed from which the printing starts.

It is not need to execute ink smear control when a color BJ cartridge is used.

2.11 Bi-Centronics Interface

The Bi-Centronics interface is supported to maintain upward compatibility with the conventional Centronics interface and implement bi-directional communication.

2.11.1 Functions

a) Centronics uni-directional interface

If the facsimile is used as a printer for an MS-DOS application, press the printer key so that the facsimile switches to the printer mode and the Centronics interface is available for uni-directional printing.

By default, it works with IBM Proprinter X24E (BJ mode) compatible machines, but can be configured to work with Epson LQ-2550 compatible machines, by BJ Setup Utility program.

b) Bi-Centronics interface

If the printer lamp is off, the Bi-Centronics interface is selected and the functions mentioned below can be used with the MultiPASS Desktop manager software under MS-Windows or Windows 95. (the INTERFACE lamp lights when one of the functions is being used).

(1) Sending

Data from the computer can be sent by facsimile.

(2) Receiving

Received facsimile data can be sent to the computer.

(3) Scanning

Documents can be scanned into the computer.

(4) Telephone dialing

Telephone dialing from the computer.

(5) Printing

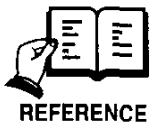
Data from the computer can be printed by facsimile.

If printing is performed under MS-Windows® or Windows 95®, set the printer key to OFF (the printer lamp goes off).

The facsimile is switched to the printer mode and printing is started by sending commands from the printer driver instead of using the printer key. The printer mode is canceled after printing.

NOTE

When the printer lamp is on, the user cannot carry out some operations (such as registration, manual transmission and reception). When operating from an MS-Windows® or Windows 95® application, if the printer key is ON, a warning flashes on screen, every few seconds.



REFERENCE

For details of the MultiPASS utility, see *the Desktop manager for Windows Service Manual* or *User's Guide*.

2.11.2 Structure

a) Centronics uni-directional interface

See *Part 2: Printer, Chapter 1: 2.2 Interface Specifications on page 1-7.*

b) Bi-Centronics Interface

The Bi-Centronics interface operates in Nibble mode that complies with the IEEE-P1284 D2.00 Sep. 10, 1993. In Nibble mode, the host computer sends data to the facsimile using the 8-bit data line as used for the Centronics interface. However, the facsimile transfers data to the host computer using the four status signal lines by dividing 8-bit data into 4 bits and sending them.

b-1) Pin Assignment

The following table lists the signals and input/output status of the pin assignments used for parallel communication.

No.	Signal	I/O	No.	Signal	I/O
1	(STROBE) HOSTCLK	IN	19	STROBE-RET[1]	
2	(DATA 1)	IN/OUT	20	DATA 1-RET	
3	(DATA 2)	IN/OUT	21	DATA 2-RET	
4	(DATA 3)	IN/OUT	22	DATA 3-RET	
5	(DATA 4)	IN/OUT	23	DATA 4-RET	
6	(DATA 5)	IN/OUT	24	DATA 5-RET	
7	(DATA 6)	IN/OUT	25	DATA 6-RET	
8	(DATA 7)	IN/OUT	26	DATA 7-RET	
9	(DATA 8)	IN/OUT	27	DATA 8-RET	
10	$\overline{\text{(ACKNLG)}}$ PTRCLK	OUT	28	$\overline{\text{ACKNLG}}$-RET	
11	(BUSY) PTRBUSY	OUT	29	BUSY-RET	
12	(P.E.) ACK DATA REQ	OUT	30	PAPER END-RET	
13	(SELECT) xflog	OUT	31	$\overline{\text{INIT}}$	IN
14	$\overline{\text{(AUTO FEED XT}}$[2]) HOST BUSY		32	$\overline{\text{ERROR}}$ DATA AVAILABLE	OUT
15	NO CONNECTION		33	GND	
16	GND		34	NO CONNECTION	
17	GND		35	+5.0V[3]	OUT
18	PERIPHERAL LOGIC HIGH[4]		36	$\overline{\text{SELECT IN}}$[2]	

1 All RETs are connected to GND.
2 These signals are valid only in Epson LQ printer control mode.
3 The level is raised to +5.0V at 3.3 kW register.
4 The level is raised to +5V at 390W register.

b-2) Data transfer from the facsimile to the host computer in Nibble mode

Data is transferred by the following steps.

The host computer sets HostBusy to low to indicate that it is ready to receive data (①).
The facsimile sets the low-order nibble of the byte (0 to 3 bits) to four lines: nDataAvail, Xflag, AckDataReq, and PtrBusy. (These lines are the reverse channel data lines.)(②).
The facsimile sets PtrClk to low (③), and the host computer receives data (0 to 3 bits).
The host computer sets HostBusy to high to notify the facsimile that the computer has received data (④).
The facsimile sets PtrClk to high to end the data (0 to 3 bits) transfer (⑤).
The host computer sets HostBusy to low to receive the data (4 to 7 bits) (⑥).
4 to 7 bits data transfer is carried out as same as 0 to 3 bits transfer and 1 bite transfer completes (②' ~ ④').
If the next byte can be transferred, the facsimile sets nDataAvail to low (⑦), and PtrClk to High to responds to host's receipt (⑤').

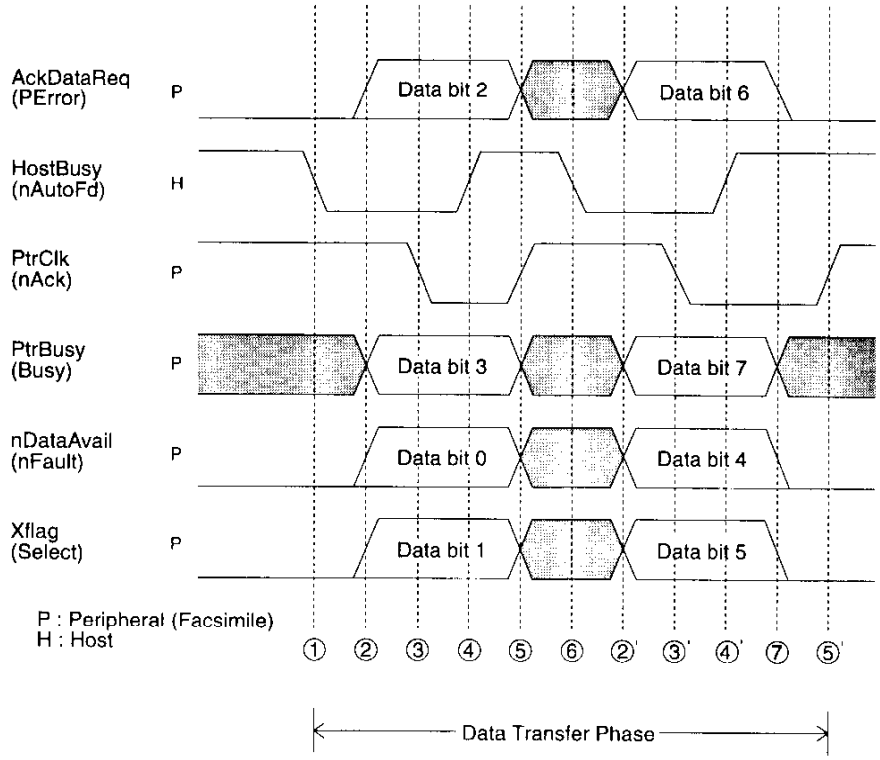


Figure 2-6 Nibble Mode Facsimile to Host Data Transfer

NOTE

Some types of host computers use a mode other than the Bi-Centronics interface Nibble mode as default. In this case, the host computer must be set to Nibble mode. Check the host computer specifications and change the print mode if necessary. The Nibble mode is specified in the IEEE-P1284 standard, but it may be called differently STD, Uni-Direction, Compatible, AT, etc. For some computers.

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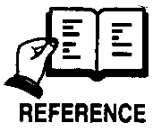
1. MAINTENANCE LIST
2. HOW TO CLEAN PARTS
3. ADJUSTMENT



REFERENCE

See *Part 1: Facsimile, Chapter 3: Maintenance & Service*, for details.

4. TROUBLESHOOTING

This section contains information to help you solve printer problems. A problem may have one or a combination of causes, including a malfunction in your computer, software, the printer cable, or the printer. Many printing problems are related to how your software interacts with the printer.
If your printer is not operating properly, try the suggestions in this section.

REFERENCE

Also, you should see *Part 1: Facsimile, Chapter 3: 4. TROUBLESHOOTING*, for details.

4.1 Errors Shown on the Display

4.1.1 User error message

REFERENCE

See *Part 1: Facsimile, Chapter 3: 4.2.1 User error message* for details.

4.1.2 Error codes

REFERENCE

See *Part1: Facsimile, Chapter 3: 4.2.2 Error codes* for details.

4.2 Errors not Shown on the Display

REFERENCE

See *Part 1: Facsimile, Chapter 3: 4.3 Errors not Shown on the LCD* in the general symptom/cure chart.

a) Operational problems

Printer does not print

If the printer is turned on, but it still does not print, there is a problem either with the printer or its communication with your computer. Follow these steps to determine the problem:

Solutions: (1) Make sure the printer lamp is on. If the printer lamp is off, press the *PRINTER* button. Then try printing.

(2) Check the interface cable connection. Make sure you have connected the correct interface cable to your computer, and that the connections are secure.

(3) Make sure that paper is loaded properly from the auto sheet feeder.

(4) Run one of the test prints described in *Part 1: Facsimile, Chapter 3: 6. TEST FUNCTIONS.* If this prints, the problem is in the communication between the printer and your computer.

(5) Make sure that the computer is set up correctly for your printer (Printer driver and output interface port).

(6) Print a screen dump from your computer. If it still does not print, there is a problem with your software, or your interface port.

b) Paper pickup/eject error

Paper is not picked up from the auto sheet feeder

Solutions: (1) Check whether the recommended paper is in use.

(2) If the problem is not cleared, make sure the printer lamp is on, and then press the *RESUME* button.

(3) If the paper is loaded, make sure that the computer is set up correctly for your printer. (Printer driver and output interface port)
If the printer cannot load paper, see *Part 1: Facsimile, Chapter 3: 4. TROUBLESHOOTING.*

Paper does not eject after printing

Solutions: Most software applications tell the printer to eject the paper after printing, however, some do not. If the printer does not automatically eject a sheet of paper after printing, press the *RESUME* button to eject the paper.

c) Print quality problems

If your print quality is not what you expect it to be, check the following list for your problem and a possible remedy or locate the problem in the sections below.

Print results	Most probable cause	Remedy
Smudged	Paper type	Try a different paper type
Blurred	Paper type	Try a different paper type
Fading	Print head is clogged or out of ink	Clean the print head or replace the ink cartridge
White streaks	Print head is clogged	Clean the print head
Dots missing	Print head is clogged	Clean the print head
Irregular dots	Print head is clogged	Clean the print head

Print density is low

Solutions: (1) The printer has two print modes, and the print density of each mode is different. The density of the HS mode is low and the density of HQ mode is high. If you are using HS mode and not getting satisfactory darkness, try HQ mode.

(2) If you use Windows®, open the option window in the printer setup window. Then, set the intensity control slide bar to a darker position.

Characters appear jagged

Solution: Check your software application to see what resolution is selected. Printing at 180 dpi or less will give a jagged look to the output. Changing the resolution to 360 dpi should correct this.

Ink stained areas

Solution: If you use the Windows®, open the option window in the printer setup window. Then, set the intensity control slide bar to a lighter position.

d) Printing problems

This section contains problems and solutions related to your printer or the software you are using.

Printout is wrong

If strange characters appear in your output, there may be a communications problem between the printer and your computer.

If your printed output does not appear as you expect, follow these steps:

Solutions: (1) Check that your cable connections are secure.

(2) Check that the printer control mode (BJ or Epson LQ) matches the printer driver you selected.

Characters on the screen do not match the printed characters

Solution: Many graphics characters and special symbols are produced by different ASCII codes on each make of computer and printer. Compare the character set in your computer manual with the printer character sets shown in *User's Guide*. Set the correct character table and printer control mode with the BJ printer set up utility.

Printing beyond the edge of the page

If the printer is printing only part of each line, follow these steps:

Solutions: (1) Make sure the paper is aligned correctly in the auto sheet feeder.

(2) Check the software setting for the right margin.

(3) Check the **"FAX PRINTER SETTING"** of user data in the facsimile mode. The **"SELECT PAPER SIZE"** item controls the horizontal print position.

Printing incorrect number of lines on a page

If the printer is not printing the number of lines you expect on a page, follow these steps:

Solutions: (1) Check the Page Length setting of BJ printer setup utility. This item determines the page length.

(2) Check the top and bottom margin settings of your software.

(3) Make sure your paper is loaded correctly.

Printer is not using the font you selected with BJ printer setup utility

Solution: Your software is overriding the BJ printer settings. Change the initialization or setup string that your software sends. You may need to do this using a menu or screen provided by your application software. See your application user's manual for information about how your software works with your printer.

Computer indicates a device time-out

A device time-out occurs when your computer sends data to the printer but the printer does not respond. The printer may be off, not printer mode, or not connected to the computer. If your computer indicates a device time-out, follow these steps:

Solutions: (1) Make sure the printer function is on.
(2) Make sure the printer's interface cable is securely attached to both the printer and the computer.
(3) Make sure paper is properly loaded in the automatic sheet feeder.
(4) Try the print operation again.

5. SERVICE OPERATION FUNCTION

5.1 Report Output Function

The printer can output BJ printer settings report manually by user operation.

5.1.1 User report output function

a) Manual output of report by user operation

The printer functions can be changed by the BJ printer setup utility. The BJ printer settings list shows the current setting about the printer.

Report type	Operations
Printer settings	Select the **"Data registration" → "7. TEST PRINT" → "Printer Settings"**.

For samples of user reports, see the *Part 1: Facsimile, Chapter 3: 6.1.2 Printer settings*.

b) Reports output automatically

There is no automatically report output.

5.2 BJ Printer Setup Utility Program

Figure 3-1 BJ Printer Setup Utility Program (Sample)

Function settings which can be set with the BJ printer setup utility program.
Here is a quick summary of the BJ printer setup utility program features. For details, type BJSETUP on the command line to start the utility program and use the on-line help.

Alternate Graphic Mode

Turns alternate graphics mode (AGM) on and off for the BJ mode. Turn on AGM for IBM Proprinter X24E emulation.

Automatic Carriage Return

Sets how the printer performs a carriage return.

Automatic Line Feed

Sets how the printer does a line feed in the BJ mode or the LQ mode.

Change Ink Cartridge

Moves the cartridge holder to the center of the platen so you can change the cartridge. Follow the steps, instructions and illustrations in the User's Guide to change the cartridge.

Character Set

Code pages and character sets may vary according to the make of the computer and printer. For the BJ mode, you can select Character Set 1 or Set 2. For the LQ mode, you can select the Epson Italic or Graphics Set.

Clean Ink Head

Cleans the BJ cartridge print head. If you see white streaks or other flaws on your printed page, clean the print head.

Code Page

Allows you to select a code page for either the BJ mode or the LQ mode. Pages are tables that show how characters, symbols, and numbers are coded.

Delete File

Deletes a parameter settings file. Delete files if you no longer need them.

Download Buffer

Allows you to change the allocation of available space in the buffer.

Eject Page

Ejects the paper or other media currently loaded in the printer.

Font

Allows you select one of 5 typefaces: Roman, Gothic, Courier, Prestige, Script for either the BJ mode or the LQ mode. This setting is ignored when the software application specifies a font.

International Character

Allows you to select a character set, characters and symbols specific to each country for the LQ mode.

Open File

Opens a saved file and retrieves the parameter settings that it holds. After you open the file, press F6 to send the settings to the printer.

Page Length

Sets the page length for BJ mode or LQ mode.

Paper Selection

Sets the paper size. Selections include A4, Letter, #10 Envelope (3.4 mm), DL Envelope (6.2 mm).

Power Off

Changes to the facsimile mode.

Preset Status

You can select one set of defaults from a list. Each set is named by country and control mode. For example, you can choose USA (LQ) or USA (BJ).

Printer

Prints a test pattern so you can check printer operation with the new settings you have just made. Before you execute this command, be sure the printer can load A4 or Letter-size paper. You can print a Demonstration of printer features, Test Print A (repeating ripple pattern), and a Nozzle Pattern Print.

Print Mode

Sets the print mode for HQ (high quality), HS (high speed), Fine.

Printer Test Patterns

Prints a test pattern so you can check printer operation with the new settings you have just made. Before you execute this command, be sure the printer can load A4 or Letter-size paper. You can print a Demonstration of printer features, Test Print A (repeating ripple pattern), and a Nozzle Pattern Print.

Printer Control Mode

Sets the emulation mode for the printer: BJ mode, LQ mode, Automatic mode.

Printer Port

Normally, your printer is attached to the first parallel port called LPT1. If you connect your printer to a different port, make an appropriate selection here: LPT1, LPT2.

Printer Settings

Prints a list of all the current printer settings. Be sure to use Letter-size or A4 paper to print this list.

Reset Printer

Takes the new printer and advanced settings you have just made and stores them as the new default settings for the printer.

Save File

Saves a parameter settings file.

Setting Mode

Before setting parameters, it is necessary to set a control mode.

Smoothing

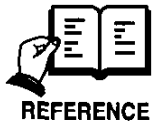
Smoothing removes the ragged edges that you see on characters and curved lines. These so called "jaggies" are caused by a stair-stepping effect caused by assembling characters and lines with individual dots when they are printed.

Text Scale

Provides compatibility with software that assumes 66 lines will fit on each page for either the BJ mode or the LQ mode.

5.3 Service Data

There is no service data setting for printer mode.


REFERENCE

For details on Printer mechanism service data setting, see *Part 1: Facsimile, Chapter 3: 5.2 Service Data Setting on page 3-33.*

5.4 Test Functions

5.4.1 User test functions

REFERENCE

For details on User Test Functions, see *Part 1: Facsimile, Chapter 3: 6.1 User Test Print Functions on page 3-44.*

5.4.2 Hexadecimal dump print

You can set the printer so that it prints the hexadecimal code data. Then, when the printer receives print data from the computer, it converts and prints in the hexadecimal code.

You only need to set this function if you decode the print data from an application program that does not send the print data correctly.

In this mode, each byte of data from the computer is printed as hexadecimal data in units of 16 bytes per line. Remaining data less than one line long are printed when the printer mode is finished.

In order to output the hexadecimal dump print, you have to change the service data switch settings in facsimile mode. In Service data – #7 PRINTER – 5. HEX DUMP MODE, select Yes = (*), then, when printer mode is entered, by pressing the *PRINTER* button, a hexadecimal dump print is output.

To stop the hexadecimal dump print press the *PRINTER* button again, and go back to facsimile mode, and select #7 PRINTER – 5. HEX. DUMP MODE No = (#). Then, when you return to the printer mode, by pressing the *PRINTER* button, normal printing is resumed.

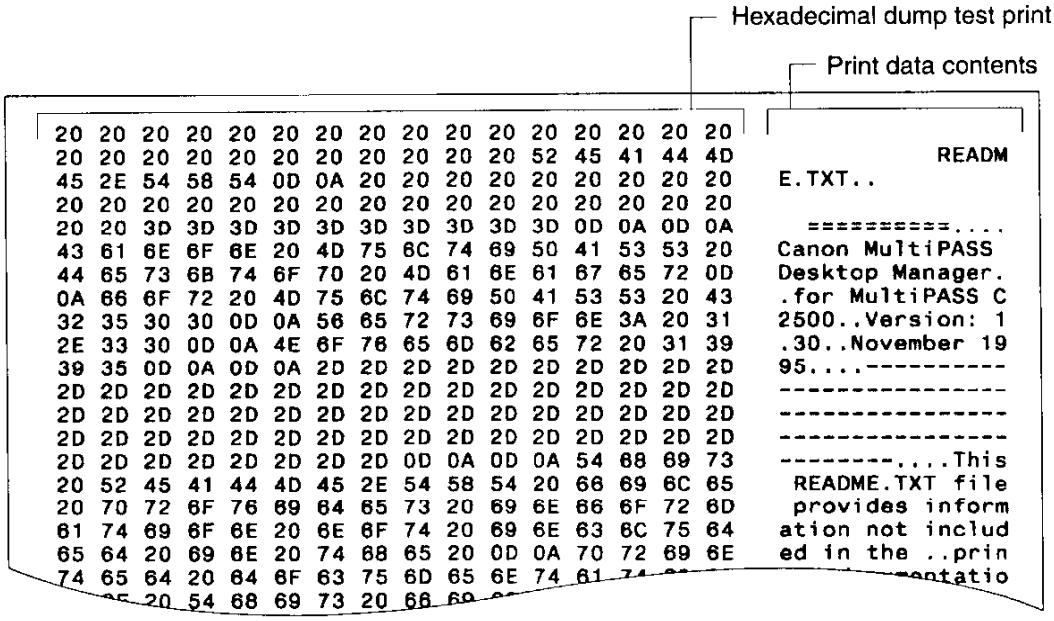


Figure 3-2 Hexadecimal Dump Print (Sample)

6. WIRING DIAGRAM

6.1 Wiring Diagram

REFERENCE

See *Part 1: Facsimile, Chapter 3: 7. WIRING DIAGRAM* in the general wiring diagram.

6.2 Connector Location and Signal Description

6.2.1 SCNT board

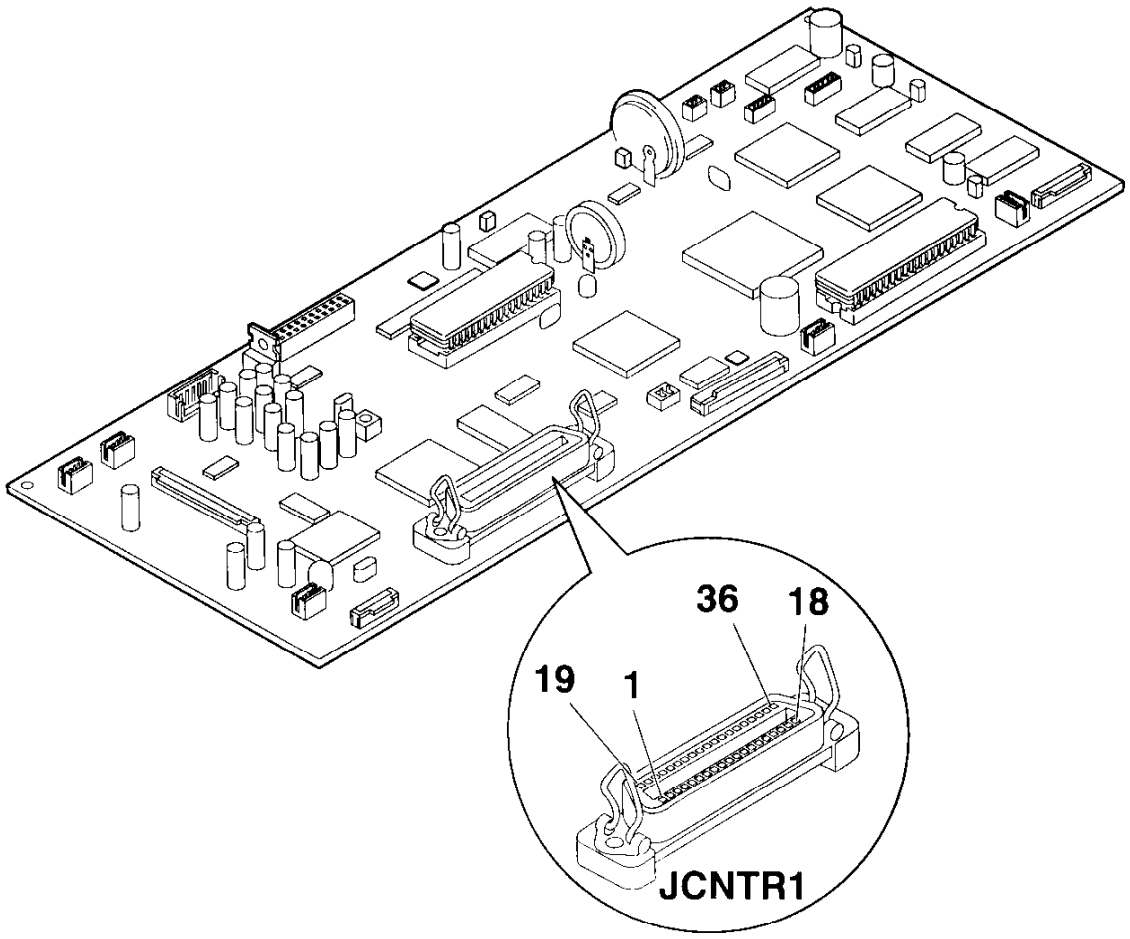


Figure 3-3 SCNT Board

JCNTR1 (Centronics connector)

Pin No.	Signal	In/Out	Source	Description
1	-STB	IN	Computer	-STROBE*3
2	IFD0	IN	Computer	DATA1*3
3	IFD1	IN	Computer	DATA2*3
4	IFD2	IN	Computer	DATA3*3
5	IFD3	IN	Computer	DATA4*3
6	IFD4	IN	Computer	DATA5*3
7	IFD5	IN	Computer	DATA6*3
8	IFD6	IN	Computer	DATA7*3
9	IFD7	IN	Computer	DATA8*3
10	ACKNLG	OUT	IC1301	*3
11	-BUSY	OUT	System controller (IC401)	*3
12	-PE	OUT	System controller (IC401)	-P.E.*3
13	-SLCT	OUT	System controller (IC401)	-SELECT*3
14	-AFXT*1	IN	Computer	-AUTO FEED XT*3
15	Not used			
16	Not used			
17	Not used			
18	+5.0V*2	OUT	Power supply	*3
19	GND	---	---	-STROBE -RET*1
20	GND	---	---	DATA1 -RET
21	GND	---	---	DATA2 -RET
22	GND	---	---	DATA3 -RET
23	GND	---	---	DATA4 -RET
24	GND	---	---	DATA5 -RET
25	GND	---	---	DATA6 -RET
26	GND	---	---	DATA7 -RET
27	GND	---	---	DATA8 -RET
28	GND	---	---	-ACKNLG -RET
29	GND	---	---	BYSY -RET
30	GND	---	---	P.E. -RET
31	-INIT	IN	Computer	*3
32	FAULT	OUT	System controller (IC401)	-ERROR*3
33	Not used			
34	Not used			
35	+5.0V*2	OUT	Power supply	*3
36	-SELIN*1	IN	Computer	-SLCT IN*3

*1 These signals are valid only in Epson LQ mode.
*2 This signal is connected to +5.0V via 3.3kW resistor.
*3 See Chapter 1 for details.

1. INSTALLATION

This section describes the steps you follow to set up the printer.

NOTE

- When installing the printer, you must complete the fax installation described in Part 1.
- No Centronics-compatible, parallel interface cable is provided with this fax package. Therefore, you must obtain an interface cable for connecting to the computer.

Contents

1.1 Choosing a Location for the Printer
1.2 Connecting the Printer to the Computer
1.3 Turning the Printer On and Off

REFERENCE

For details of printer driver installation and default settings, see the *User's Guide.*

1.1 Choosing a Location for the Printer

Whether at home or in the office, you need to find a comfortable and convenient location for the printer. However, the maximum length of the interface cable must be approximately 2.0m (6.5 feet).

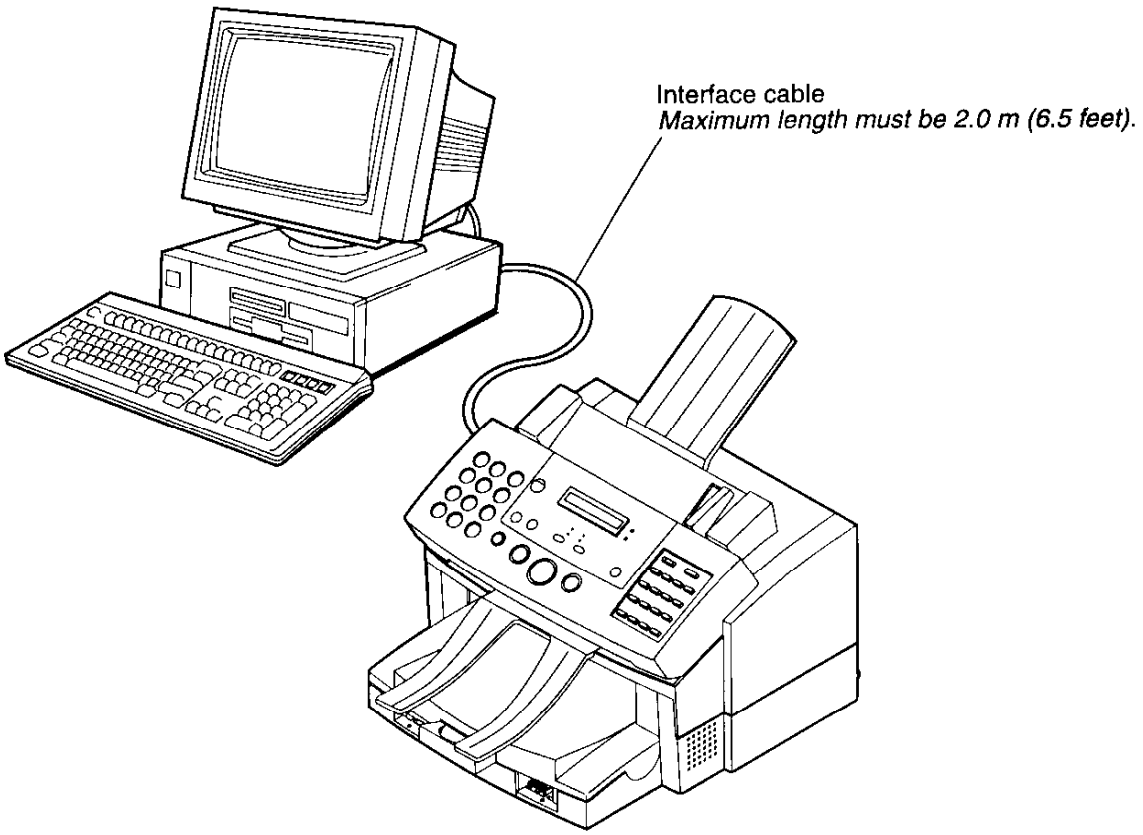


Figure 4-1 Location for the Printer

1.2 Connecting the Printer to the Computer

(1) Make sure the computer is powered off.
(2) Make sure the fax outlet is pulled out to turn off the power.
(3) Align the cable connector with the printer's parallel interface connecter so the shapes match. Gently press the cable connector into the printer's connector.
(4) Secure the cable connector by snapping the two wire clips (located on the printer) into the cable connector.
(5) Connect the other end of the interface cable to the parallel port on the computer.

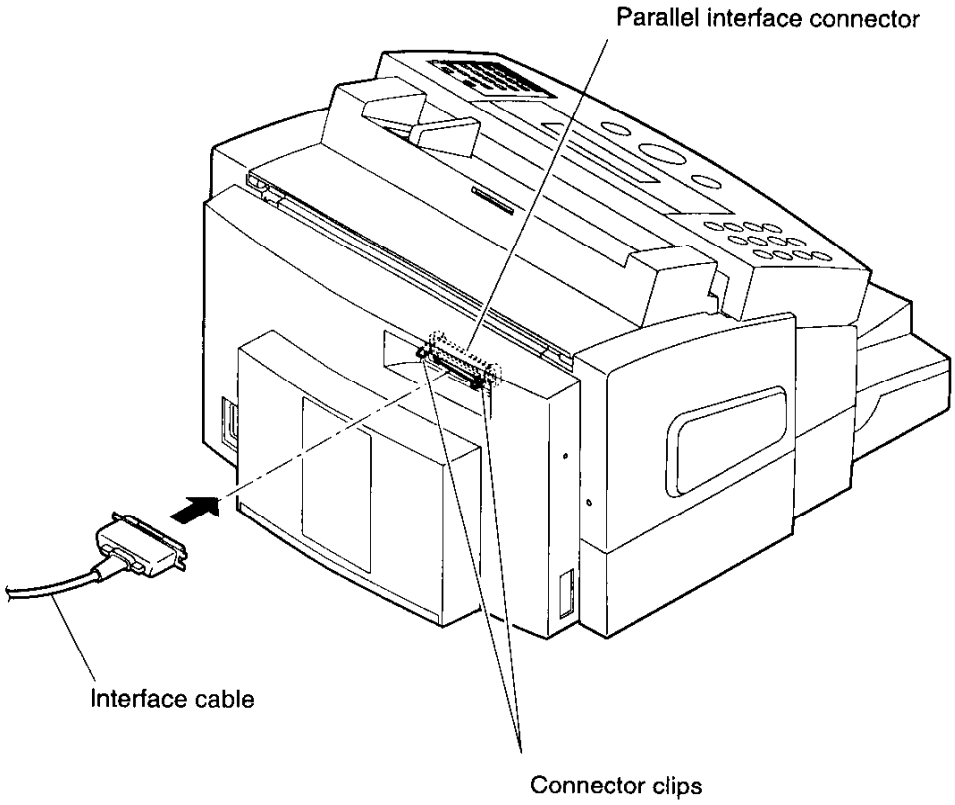


Figure 4-2 Connecting the Interface Cable

1.3 Turning the Printer On and Off

To turn on the printer, press the *PRINTER* button on the operation panel. The printer function is turned on and the printer makes several noises as it gets ready to print. When the printer is ready to print, *PRINTER* lamp comes on the operation panel.

To turn off the printer, press the *PRINTER* button again.